HNOLOGY DEPT

POPULAR SCIENCE

MONTHLY

ECHANICS AND HANDICRAFT

5¢ July

PUBLIC LIB
JUN 30 1
DETRO

How to Build a PLASTIC PORCH PAGE 131

Wilbur Shaw Flies a Car PAGE 72

Savage-Stevens "22"s

scoring hits everywhere

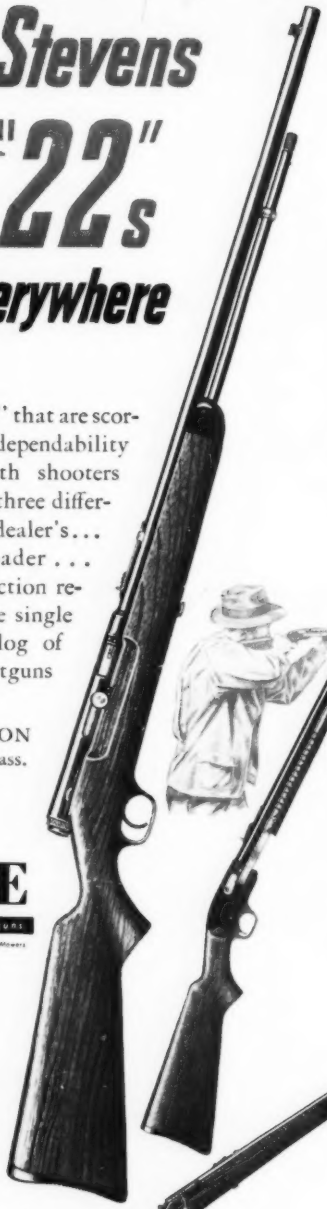
Here are three "22's" that are scoring *hits* for value, dependability and performance with shooters everywhere. See these three different style rifles at your dealer's... lightning-fast auto-loader . . . smooth operating slide action repeater . . . handy, reliable single shot. Write for free catalog of Savage, Stevens and Fox shotguns and rifles.

SAVAGE ARMS CORPORATION
Firearms Division • Chicopee Falls, Mass.

SAVAGE

SAVAGE • STEVENS • FOX *Rifles and Shotguns*

SAVAGE • WORCESTER *Power and Hand Lawn Mowers*



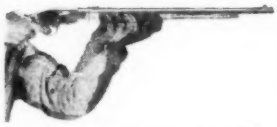
STEVENS MODEL 87

.22 cal. auto-loading rifle—for shooters who want an accurate, moderately priced semi-automatic. Just the rifle for rapid firing at small running game, or for plinking fun. "*15 shots as fast as you can pull the trigger.*" Tubular magazine. Instantly adjustable as auto-loader, bolt action repeater, or single shot rifle. MODEL 85—same as Model 87 except 6 shot, with clip magazine. Both are "*three-in-one*" rifle values.

Sturdy, simple action—quickly disassembled, without tools, for cleaning.

SAVAGE MODEL 29

Short forearm stroke—slide travels only 1½" in loading and ejecting.



.22 cal. slide action repeating rifle. The famous "22" with the SHORT slide action. A flick of the wrist ejects and loads cartridge smoothly, surely—without disturbing aim or rifle position. Dependable; hammerless action . . . one-piece bolt removable without tools for cleaning . . . single take-down screw . . . walnut stock . . . extra long slide handle, vertically grooved for firm grip.

STEVENS MODEL 15

Loaded NOT Cocked — **Hand Cocked** — **Independent of Bolt**

SAFETY FEATURE

.22 caliber single shot, bolt action rifle. Man's size, yet correctly proportioned for youngster's use also. Hard cocking action, *independent of bolt*, provides maximum safety. And here are some other features: bolt handle directly over trigger for fast operation; newly proportioned stock with handsome black-tip fore-end; 24" barrel; gold bead front and open rear sight with elevator.

LEOPARD

GENUINE VINYL PLASTIC

Auto Seat Covers

for all cars, all years, makes and models

2.95 EACH

Guaranteed

Try in your car for 7 days at MY risk

FREE

OF EXTRA COST

DEAR MOTORIST:
Compare these luxurious yet **PRACTICAL** seat covers with cloth or woven straw selling for much more! See how they beautify your car and give **MUCH MORE PROTECTION** to the upholstery! Try them right in your own car **WITHOUT ANY OBLIGATION** to keep them—entirely at **MY** risk! If not thrilled, return them within **7** days and **back** comes your money! You have **everything** to gain—**NOTHING** to lose!
—THE SEAT COVER KING

SENSATIONAL MILLION DOLLAR DEVELOPMENT
American science and industry spent well over **$1,000,000** to develop the amazing **VINYL PLASTIC** that made these seat covers possible. It's **NEW, DIFFERENT, TOUGH . . .** yet it feels like **SILK** and resists **FLAME, WATER, GREASE, GRIME and many ACIDS!**

SLIDE ON OR OFF QUICK & EASY!
Simplified construction with **GRIP-TITE** elastic binding! Slide them on . . . slide them off in **LESS THAN 1 MINUTE!** Can be folded away when not in use! No tacking . . . no sewing that may mar upholstery needed. Mildew and mothproof. **NEVER CRACK OR PEEL!** What a difference between regular cloth or straw covers and this tough, genuine **VINYL** plastic! Keeps cool in summer. Cleans off easily—**NO** laundering ever! Resists soiling by babies or pets! Water, grease, dirt can't penetrate this tough plastic material that wears and wears! Even **$25.00** tailored to measure textile covers do not give you this thorough protection!

SAVE WITH SAFETY THIS MODERN WAY!
Did you ever lift up old fashioned textile seat covers only to find that dust and grime, grease and water had soaked right into the upholstery? Car dealers always look **UNDER** the seat covers. Be smart. Don't be lulled into false security! Save yourself disappointment and aggravation! Have **FULL** protection with these modern, beautiful seat covers! Enjoy the convenience of sliding them on or off to suit your needs. Best of all, you pay only **2.95** for **FRONT** or **REAR** seat!

SPECIAL SAVINGS OFFER!
A pair for front and rear seats—**BOTH** for only **5.00.** You save yourself about a dollar more! **SEND NO MONEY!** Pay price, plus postage on delivery or send check, money order or cash for quick, **FREE** delivery and **SAVE EVEN MORE!** Please mention car make, model and year; also if SPLIT front coupe, or 4 door FULL front. Yes you can try these seat covers at **OUR** risk for **7** days. Full price cheerfully refunded if you are not thrilled. **RUSH COUPON NOW!**

MOTO-MATIC COMPANY, Dept. 7-G-150, 129 West 33rd Street, New York 1, N. Y.

New

BIG $1.25 SIZE
SENSATIONAL CREAM
PROTECTS—BEAUTIFIES
YOUR AUTO CHROME

GIVEN—New, nationally advertised **PRO-KROME** Cream that **PROTECTS** your auto **CHROME** while adding new, **GLEAMING BEAUTY!** Just smooth on—So easy and **QUICK**—only **5 minutes** needed! Large **$1.25** tube with **EACH** seat cover. **2 TUBES** with order for set of **2** covers. Also sold separately at **$1.25** each. **PRO-KROME** is yours to **keep** even if you **RETURN** the seat covers for refund! Act now! You have everything to **GAIN** and **nothing** to lose.

MOTO-MATIC COMPANY, Dept. 7-G-150
129 West 33rd Street, New York 1, N. Y.

"Mr. SEAT COVER KING": Rush.....sets **LEOPARD DESIGN SEAT COVERS,** as checked below, on **7 DAY TRIAL.** I will pay low price plus postage on arrival. You are to refund full price paid if I am not satisfied in **EVERY** way! The **PRO-KROME CREAM** is mine to **KEEP** in **any** case.

☐ Send **FRONT** seats—**2.95** ☐ Send **BACK** seats—**2.95**
☐ Send set FRONT & REAR at cut price of—**5.00**

Car MODEL.....YEAR.....Full or Split Front.....

NAME.....

ADDRESS.....

TOWN.....**STATE**.....

☐ Save **MORE** by enclosing **CASH** or **MONEY ORDER** and we pay **ALL POSTAGE CHARGES. Same MONEY BACK GUARANTEE!**

America's Leading New-Idea Magazine for 80 Years

Founded 1872, Vol. 161: No. 1

POPULAR SCIENCE
REG. U. S. PAT. OFF. *Monthly*

Mechanics and Handicraft

VOLTA TORREY, EDITOR • Howard Allaway, MANAGING EDITOR
Howard C. Jensen, ART EDITOR • Frank Rowsome Jr., ASSISTANT MANAGING EDITOR

SENIOR EDITORS: Harry Walton (Mechanics & Handicraft), Hartley E. Howe (Features), Martin Mann (Copy).

ASSOCIATE EDITORS: Alden P. Armagnac, Devon Francis, Sheldon M. Gallager, Kendall W. Goodwyn, Robert Gorman, Wesley S. Griswold, Herbert O. Johansen, Herbert R. Pfister, Denis Sneigr, Robert P. Stevenson, Ruth Westphal, Andrew R. Boone (Los Angeles).

ART: Harry Samuels (Director), Herbert Anthony, Rolf O. Erickson, Eric Karminski Jr., Richard Meyer, Frances Cooper Daniels.

PHOTOGRAPHY: W. W. Morris (Director), Hubert Luckett, Orlando Guerra.

EDITORIAL ASSISTANTS: Julia C. Bove, Carol Ennis, Rita K. Gilbert, Georgette Sparks, Harriet Trowbridge.

This Month's Big Features:

Triangles to Stop the Big Bombers 51
Super Dome Cars Will Carry 68 Upstairs 56
U. S. Unwraps Jet Giants 58
The Great Subway Maze Is Still Growing 60
Million-Dollar Firms Grow from Hobbies 66
What It's Like to Fly a Car 72
GI Jeep Dons Dress Uniform 79
Now You Too Can Own a Yacht 96
How You Become a Flying Radar Man 104
World's Best Truck Garage 109
Back-Yard Mechanics Build Racing Planes 117
New Porch Roofing Lets in Light 131
Detroit Designs a Super Hot Rod 140
Gus Goes Fishing—and Gets Hooked 148
We're in Love with Louvers 158
Kitchen Doubles as Photo Darkroom 162
17 Extra Uses for Your Vise 166
Plugs for Household Appliances 184

(More features and departments are listed on page 4.)

Those back issues of Popular Science Monthly on your shelf contain thousands of good ideas that never grow old. The fully cross-referenced index that starts on page 187 covers two volumes (a full year) of the Mechanics & Handicraft section, puts every article at your fingertips.

Godfrey Hammond, PUBLISHER · Stephen P. Glennon, ADVERTISING DIRECTOR

ADVERTISING OFFICES: NEW YORK — 353 Fourth Ave.; CHICAGO—360 North Michigan Ave.; DETROIT—820 Book Bldg.; SAN FRANCISCO—681 Market St.; CLEVELAND—328 Citizens Bldg.; LOS ANGELES—2550 Beverly Blvd.
EDITORIAL OFFICES: 353 Fourth Avenue, New York 10, N. Y.

Published monthly at 353 Fourth Avenue, New York 10, N. Y., by Popular Science Publishing Co., Inc., Godfrey Hammond, President and Treasurer; R. C. Wilson, Stephen P. Glennon, Vice-Presidents; F. W. Briggs, Secretary. Entered as second-class matter Dec. 28, 1918, re-entered as second-class matter July 26, 1948, at the Post Office in New York, N. Y., under the act of March 3, 1879; additional entry as second-class matter at Dayton, Ohio. Entered as second-class matter at the Post Office Department, Canada. Printed in U.S.A. Copyright, 1952, by Popular Science Publishing Co., Inc. All rights reserved in the United States, Great Britain, and in all countries participating in the International Copyright Convention and Pan-American Copyright Convention. Yearly subscriptions to United States, its possessions and Canada, $3.00 (2 years, $5.50; 3 years, $7.50); foreign countries $1 per year extra. Four weeks' notice is needed to change a subscriber's address. Please give both old and new addresses, including postal zone numbers.

doubles the life of cylinders, pistons and rings!

America's Doctors of Motors—your reliable mechanics—know that Perfect Circle's new 2-in-1 Chrome Set marks a new high in piston ring performance! Here's why:

First, because *solid* chrome plating protects the top compression rings *and* oil ring rails . . . resists wear under severest operating conditions!

Second, because only the 2-in-1 Chrome Set provides two interchangeable expander springs with every oil ring . . . allowing each mechanic to select the correct spring pressure—either NORMAL or HIPRESSURE—for every installation!

Find out why Perfect Circle's 2-in-1 Set is the most recommended ring set in piston ring history! Ask your Doctor of Motors to install it in your car—for double life, lasting power, and new oil economy!

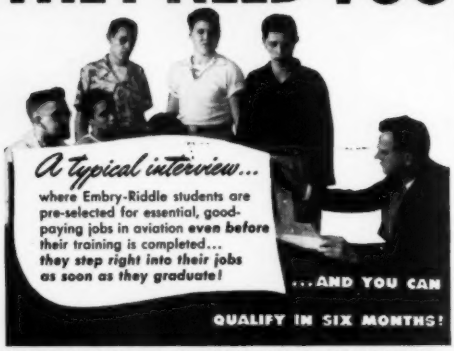
SOLID CHROME PROTECTS THESE WEARING SURFACES

Perfect Circle

PISTON RINGS

The Standard of Comparison

THEY NEED YOU



EMBRY-RIDDLE OFFERS YOU COMPLETE 6-MONTHS TO 2-YEAR COURSES...NOW!

Your Career is Waiting!

The high regard of Embry-Riddle training by the leading airlines and the entire aviation industry is demonstrated *time and again* by the big demand for Embry-Riddle graduates.

There's an important high priority job in aviation waiting for you...however, if you do enter the services, Embry-Riddle training will definitely give you rating advantages. Thousands of Air Force men are Embry-Riddle trained.

AIRCRAFT & ENGINE MECHANICS

Vast numbers of *properly* trained A & E Mechanics are urgently needed. Our C. A. A. approved school with a quarter-century experience assures your quickest advancement. Embry-Riddle students learn fast with modern equipment, including jet...live aircraft, airline-size hangars.

AERONAUTICAL DESIGN AND TECHNOLOGY

Embry-Riddle's accelerated 26-mo. Aeronautical Design and Technology Course provides finest training available. Technicians with management responsibility enjoy highest salaries!

COMMERCIAL PILOT

Embry-Riddle trained pilots benefit from our years of experience with 30,000 students... the best instructors, up-to-date aircraft, superb year-'round flying weather. Also Instrument and Instructor's ratings.

A & E COMBINED WITH COMMERCIAL PILOT

Airmen with *dual* pilot-engineering ability are needed by aviation companies and operators. Embry-Riddle combination training offers you the most in your aviation career.

Embry Riddle
International
SCHOOL OF AVIATION
MIAMI 30, FLORIDA

CLASSES ARE BEGINNING NOW...SEND THIS COUPON TODAY!

Dean of Enrollments – Dept. 91
Embry-Riddle School of Aviation
Miami 30, Florida

Please Print

NAME _____
ADDRESS _____
CITY _____
STATE _____ AGE _____

I am interested in...
- ☐ A & E Mechanic
- ☐ Commercial Pilot
- ☐ Aeronautical Design and Technology
- ☐ A & E Combined with Commercial Pilot
- ☐ A & E Combined with Private Pilot

Check One ☐ Veteran ☐ Non-Veteran

TRAIN IN MIAMI—AIR CAPITAL OF THE WORLD

Picture Features

Gun-Toting Car Goes Forward or Back.. 55
World's Fastest Merry-Go-Round..... 86
Atomic Engine to Run Submarine..... 92
How a Cotton Picker Works..... 94
Robot Squirrel Hunts His Own Food....100
Light Waves Point Out Engine Troubles..113
Nation Honors Hero Truck Driver.....122
Plastic Cars? Not Now!.....127

Mechanics & Handicraft

What's New on Radio Row..... 90
My Trailer Is an Old Car.....145
Accessories for Your Car.....146
Auto Care on the Highway.....147
Terrace Wagon Serves Outdoor Meals....153
News from the Camera Shops.....165
Kansas TV Fan Gets Both Coasts.....171
Twin Motors Can Make Outboard Safer..174
Boating Tips.....176
Homemade Jig Cuts Tenons Accurately..182
New Garden Tools.....186
This Machinery Strikes a Match.....190

Departments

Letters 6
New Ideas from the Inventors..... 83
I'd Like to See Them Make..... 91
Aids to Modern Living.....124
P.S. Last Minute News and Notes.....130
Craftsmen in Uniform.....138
Hints from the Model Garage.....151
Keeping the Home Shipshape.....160
New Tools.....172
New Shop Ideas.....180

NEXT MONTH . . .

Installing a Kitchen Fan

Does your kitchen feel like a slow oven these warm days? If greasy vapors condense on walls, or annoying cooking odors sweep through the house, there's a simple solution. An article in the August issue will tell you how to install an exhaust fan to give these troubles the bum's rush.

ORDER BY MAIL
SAVE UP TO 50%

New! ELECTRONIC **WALKIE-TALKIE** COMMUNICATION SYSTEM

- NO BATTERIES
- NO PLUG-IN

$3.95 complete

Perfect for room to room, house to garage, etc. No batteries, no tubes. COMPLETE 2-WAY TELEPHONE SYSTEM works at amazingly long distances. Handy pocket size. Electronic voice powered. NO LICENSE OR PERMIT NEEDED. Not war surplus . . . brand new. Two complete units ready to use. Quantity limited. Order today

FLEXIBLE SUN VISOR

Approved by: Police, Safety Bureaus Insurance Companies, Truck Drivers.

ONLY $1.00

Like looking through fine sun glasses! Stops glare without reducing vision. **No tools**, no bolts, **no screws**, no glue! Adheres permanently to the **inside** of your windshield. You'll wonder how you ever drove without it!

AUTO SEAT COVER BARGAINS!

New *Candy Stripe* AUTO SEAT COVERS

Red, Blue, Green or Grey

SPECIAL INTRODUCTORY OFFER

$2.95 FRONT ONLY

FRONT AND REAR....$5.00

FITS ALL CARS

TRY IN YOUR CAR AT OUR RISK!

Now, at last, you can have the **smartest seat covers** to protect your upholstery and add distinction to your car at sensational **low cost**. Tailored of miracle plastic in luxurious **candy stripe design**. Choice of 4 rich looking color combinations . . . red, gray, blue or green. New snap on action holds them tight. **FITS ALL CARS**. Colorfast! Can't fade or shrink. Waterproof, stainproof, greaseproof. Resists burns. Cleans easily with a damp cloth. Limited quantity.

Give year and make of car, 2-door, 4-door or coupe.

EXACT COPY OF $50 SEAT COVER PATTERN!

AMAZING *New* WATCH with MECHANICAL BRAIN

Included 1 year Guarantee and Lifetime Certificate of Service

- It "Remembers"
- It Tells Time
- It Tells Date

Precision Jeweled. Imported Swiss Movement. Accurate. Dependable. Push-Button Stop and Start. Red Sweep-Second Hand. Unbreakable Crystal. Triple Chrome Plated Case. Shock Resistant. **Nite-Vue Radium Glow Dial.** Anti-Magnetic. Times Shop work. Times Photography. Times Sports. Times Races. Times Lab. work Times Planes. Expansion Band Included.

Compare It at '50.00

SPECIAL OFFER $8.95 Plus 90c Fed. Tax

100% GUARANTEE Your Money Promptly Refunded If You Are Not Delighted

Free! **10 DAY TRIAL**

SPECIAL OFFER!

SAVE $3 ON A COMPLETE SET OF SPARK PLUGS

GUARANTEED FOR 10,000 MILES

$1.98 COMPLETE SET OF 6

Set of 8 . . . $2.64

What a buy! Famous AC or AUTO-LITE Spark Plugs at a fraction of their usual cost. Thoroughly reconditioned and **guaranteed to give you at least 10,000 miles** of trouble-free driving. Supply limited. Act Now! Why waste money cleaning your old plugs when a few pennies more replace your complete set!

SPARK PLUG WRENCH Only 29¢ with order

New! GIANT BEACH BALL

over 3 feet high

$1.49

Introductory Offer

Exciting new fun for young and old! Gay multi-colored giant rubber ball features one piece seamless construction . . . is strong enough to stand on! Patented blow-up feature can't leak! Inflates easily by mouth or pump. Replaced without charge if you ever break it under ANY condition!

YOUNG PRODUCTS, DEPT. 536 2605 ELMHURST, DETROIT 6, MICH.

SEND NO MONEY—MAIL THIS COUPON

YOUNG PRODUCTS, DEPT. 536
2605 ELMHURST AVENUE
DETROIT 6, MICHIGAN

Please Send The Following Items:

AUTO SEAT COVERS

Make of Car _____

☐ 2-Door ☐ 4-Door ☐ Coupe

Other: _____

☐ Red ☐ Green
☐ Blue ☐ Grey
☐ Front Only ☐ Front & Rear

☐ WALKIE-TALKIE
☐ AUTO SUN VISOR
☐ BEACH BALL
☐ SPARK PLUGS
☐ CALENDAR WATCH

NAME _____

ADDRESS _____

CITY _____ STATE _____

☐ Send Items Listed. I will pay Postman Plus Postage.

SAVE MORE!

☐ I want to save postage. I am enclosing full payment.

Letters

Popular Science Monthly Honored

Congratulations!

Your organization has been voted the National Safety Council's Public Interest Award for 1951. We here at the Council

have been aware of all you have been doing for safety, and we are delighted that the judges agreed.

NED H. DEARBORN, President
National Safety Council, Chicago.

Other magazines honored with such an award by the National Safety Council this spring were The Reader's Digest, Redbook, Better Homes & Gardens, *and* Parade.

Do Train Wheels Slip?

Down here on the Norfolk & Western Railway we've been arguing over what happens to a pair of railroad-car wheels on a curve, where the outside wheel must travel farther than the inside one.

One side maintains that because the wheel edges are tapered they permit the outside wheel to travel farther without causing the inside one to slip. The other side (my side) maintains that the inside wheel does slip and that this compensates for the shorter distance it travels.

Could you help us settle the argument?

GEORGE A. WEBB, Norfolk, Va.

You're both partly right. On flat wheels there would be sure to be slippage. But for years all railroad-car wheels were tapered on the theory that the outside wheel would ride up on its greatest diameter, while the inside one would slide across to its smallest diameter. This reduced slippage to a minimum but produced a problem on straight track, where the wheels would tend to "hunt," or weave from side to side.

Believing that this hunting was worse than slipping, especially at high speeds, the Pennsylvania Railroad recently started making flat-edge wheels and liked them so much that they are now using them on all their cars. Whether other roads will follow suit nobody knows. Anyhow, as things stand now, tapered wheels don't slip—at least not much—and flat wheels do.

Antifreeze Won't Overheat Engine

Could you please answer a question for us? Which will run cooler—a car engine with all water in the cooling system, or one with a permanent antifreeze mixture?

RANDALL COWLES, Detroit.

Ethylene glycol, the major constituent of a permanent-type antifreeze, has a lower heat-transfer capacity than water. Therefore, you might expect an engine with antifreeze to run hotter. But it doesn't. If the cooling-system thermostat is functioning properly, it will keep engine-operating temperature the same in both cases.

PSM Scooter Tours Alaska

I would like to tell you that maybe I was the first one to ride a scooter along the Alaska Highway before Mr. Bulstrode did ["Down the Alaska Highway on a One-Lung Scooter," May '52, p. 122].

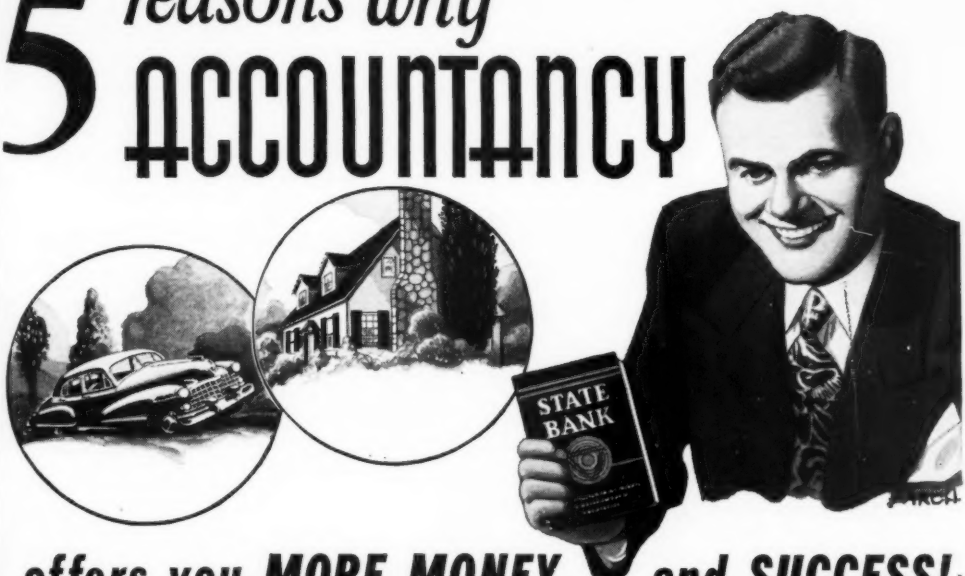
I was with the R.C.A.F. at Teslin in the Yukon, and I made the scooter [above] from a picture in your magazine in 1946.

ROGER CLEMENT, Montreal.

Gear Garble

Why can't auto people express themselves intelligibly when they talk about gears? They tell me a 3-to-1 rear end is a lot higher than a 4-to-1 one, but 3 wasn't noticeably higher than 4 when I left school. And when they mention steering I really get confused. For instance: "The 15-to-1 steering is of

5 *reasons why* ACCOUNTANCY



offers you MORE MONEY . . . *and* SUCCESS!

REASON #1. If you were an expert accountant right now, chances are you would find yourself among the highest-paid of all professional men and women. Even back in "depression years," surveys showed that accountants earned more on the average than men in other major professions.

REASON #2. The demand for accountants is great—everywhere. All businesses must have trained accountants to cope with ever-growing requirements. It's a profession offering wide opportunity—always—to the man who knows.

REASON #3. You can fit into any business, anywhere in the country—because accounting principles are universal. Think what this means in terms of security and independence!

REASON #4. Accountancy is open to all. Any man or woman of good intelligence, who enjoys figure work and is willing to follow LaSalle's systematic "problem method" plan, can rapidly qualify for a highly profitable, enjoyable lifetime career . . . and he doesn't have to finish his training before beginning to "cash in."

LASALLE
417 S. Dearborn St.,
CHICAGO 5, ILL.

REASON #5. Without losing a day from your present work, you can prepare in spare hours at home, at low cost, under LaSalle's step-by-step "Problem Method" of "learning by doing." This famous plan accounts for LaSalle's remarkable record of having trained nearly 10 per cent of all Certified Public Accountants in the U. S. . . . and of having put many thousands of others into high-paying careers.

Send today for LaSalle's interesting booklets, "Accountancy, the Profession That Pays," and "Success Reports." Learn about the five great fields of opportunity . . . and LaSalle's time-tested plan for helping men and women to rapid advancement, higher income, greater prestige and professional standing. The coupon below will bring these fact-filled booklets to you—without cost or obligation—also, a free sample lesson showing LaSalle's famous "Problem Method" plan of instruction.

GET FREE SAMPLE LESSON

WHICH . . . ? can help you most

- ☐ Accounting—Elements to C.P.A. Coaching
- ☐ Bookkeeping
- ☐ Cost Accounting
- ☐ Auditing
- ☐ Income Tax
- ☐ C.P.A. Coaching

LaSalle Extension University
A Correspondence Institution
Dept. 783-HR 417 S. Dearborn St., Chicago 5, Ill.

Please send me, free of all cost or obligation, a sample lesson in Accounting . . . also, your 48-page illustrated books, "Accountancy, the Profession that Pays," and "Success Reports."

Name.....*Age*.....

Address.....

City, Zone, State.....

WHAT SECRET POWER DID THIS MAN POSSESS?

BENJAMIN FRANKLIN
(A Rosicrucian)

WHY was this man great? How does anyone—man or woman—achieve greatness? Is it not by mastery of the powers within ourselves?

Know the mysterious world within you! Attune yourself to the wisdom of the ages! Grasp the inner power of your mind! Learn the secrets of a full and peaceful life!

Benjamin Franklin—like many other learned and great men and women—was a Rosicrucian. The Rosicrucians (NOT a religious organization) first came to America in 1694. Today, headquarters of the Rosicrucians send over seven million pieces of mail annually to all parts of the world. Write for YOUR FREE COPY of "The Mastery of Life"—TODAY. No obligation. No salesmen. A non-profit organization. Address: Scribe G.X.G.

THIS BOOK FREE!

The ROSICRUCIANS
SAN JOSE • (AMORC) • CALIFORNIA

SEND THIS COUPON

Scribe G.X.G.
The ROSICRUCIANS (AMORC)
San Jose, California

Please send me the *free* book, *The Mastery of Life*, which explains how I may learn to use my faculties and powers of mind.

Name_____

Address_____

City_____

course far faster than the conventional 22-to-1 deal." What in gobbledy-gook's name is that "faster" nonsense?

S. J. PRENTISS, Athens, Ga.

You can unscramble this confusion if you remember that the term gear *is not the same as the term* ratio; *in fact, the two are exactly opposite. The higher the* gear, *the lower the* ratio *(the lower the number in the ratio designation); and the lower the* gear, *the higher the* ratio. *Thus a 3-to-1 rear end is a higher* gear *than the 4-to-1, but it is a lower* ratio *because its number is lower.*

The same applies to steering, except that another factor is added—the time it takes you to turn the wheels from lock to lock. The 15-to-1 ratio takes fewer steering-wheel turns than the 22-to-1 ratio to produce the same front-wheel deflection. Thus the lower ratio takes less time and is said to be "faster."

Steam Locos Ride Again

Contained in your March issue [p. 150] is the most noteworthy article on motive power to appear in a non-railroad magazine in years. Author Henry B. Comstock, a former railroad-magazine editor, has at last presented accurate, untainted performance figures that do the modern, efficient Norfolk & Western steam locomotives justice.

Heretofore, editors have been given to displaying honeyed pooh-pooh in which 40-year-old steamers are always painted as extravagant and broken-down tramps beside rakish Diesel penny-pinchers. Why, that's like putting your cover-painting Ford up against a Model T.

H. REID, Norfolk, Va.

Cleaning Spark Plugs

Does it harm a spark plug to soak it in white gasoline and then scrape out the softened carbon?

JACK BASSLER, Temple, Tex.

This will do no harm, but you never will get the plug as clean as your garage man can in a couple of minutes with a sand-blaster made especially for the purpose.

A
a

Ho
sav
mi
rul
ari
tim
and
est
age
pla
cav
ste
sky
int
lay

AU
Mal
tria
Oth

Nam

Add

Occ

Emp

R
A
IN
AS
SE
IT

AUDELS
REFRIGERATION

$
ant
Cha

$4

AU
MAI
sen
Othe

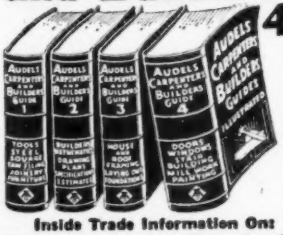
Nam

Add

Occ

Emp

AUDELS Carpenters and Builders Guides



4 vols. $6

Inside Trade Information for Carpenters, Builders, Joiners, Building Mechanics and all Woodworkers. These Guides give you the short-cut instructions that you want—including new methods, ideas, solutions, plans, systems and money saving suggestions. An easy progressive course for the apprentice and student. A practical daily helper and Quick Reference for the master worker. Carpenters everywhere are using these Guides as a Helping Hand to Easier Work, Better Work and Better Pay. To get this assistance for yourself, simply fill in and mail the **FREE COUPON** below.

Inside Trade Information On:

How to use the steel square—How to file and set saws—How to build furniture—How to use a mitre box—How to use the chalk line—How to use rules and scales—How to make joints—Carpenters arithmetic—Solving mensuration problems—Estimating strength of timbers—How to set girders and sills—How to frame houses and roofs—How to estimate costs—How to build houses, barns, garages, bungalows, etc.—How to read and draw plans—Drawing up specifications—How to excavate—How to use settings 12, 13 and 17 on the steel square—How to build hoists and scaffolds—skylights—How to build stairs—How to put on interior trim—How to hang doors—How to lath—lay floors—How to paint

AUDEL, Publishers, 49 W. 23rd St., New York 10, N. Y.

Mail Audels Carpenters and Builders Guides, 4 vols., on 7 days free trial. If OK I will remit $1 in 7 days and $1 monthly until $6 is paid. Otherwise I will return them. No obligation unless I am satisfied.

Name_____

Address_____

Occupation_____

Employed by_____ 44

REFRIGERATION AIR CONDITIONING INFORMATION IN A HANDY FORM

ASK TO SEE IT!

Every Serviceman, Mechanic & Operator can use AUDELS REFRIGERATION & AIR CONDITIONING GUIDE, containing Practical, Inside Trade Information on the whole subject of Refrigeration & Air Conditioning. Tells How to Service, Operate & Repair Modern Household, Commercial & Industrial Units & Air Conditioning Systems. 1280 Pages, 46 Chapters Fully Illustrated & Indexed for Quick Reference.

1001 FACTS

This big, highly indorsed book, easy to understand, gives useful basic principles on How to Repair & Install Compressors, Control Devices. How to locate Electric Motor Troubles. How to Service & Adjust Cold Storage Lockers, Quick Freezing Units, Dairy & Market Refrigerators, Ice Cream & Soda Fountains, How to Maintain Water Coolers, Marine Refrigeration, Plant Auxiliaries, Ice Making, Ammonia Plants, Brine Systems, Servicing Air Conditioning Systems, Replacement of Refrigerants including Freons, Heat Transmission & Pressure Temperature Charts, Tables, Duct Systems, Safety Codes, etc.

$4 ANSWERS YOUR QUESTIONS

Get this Information for Yourself. Mail Coupon today.

COMPLETE • PAY ONLY $1. A MONTH

AUDEL, Publishers, 49 W. 23rd St., New York 10, N. Y.
MAIL AUDELS REFRIGERATION GUIDE for free examination. If O. K. I will send you $1 in 7 days; then remit $1 monthly until price of $4 is paid. Otherwise I will return it.

Name _____

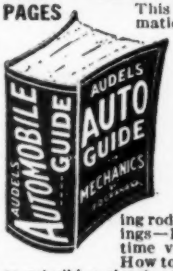
Address_____

Occupation _____

Employed by_____ 44

WHAT ALL AUTO MECHANICS WANT TO KNOW

1800 PAGES



This Big Practical Book gives full information with working diagrams covering the principles, construction, ignition, service and repair of modern cars, trucks and buses.

Diesel Engines, Hydramatic & Fluid Drives Fully Explained.

A complete Guide of 1800 pages, with over 1500 illustrations showing inside views of working parts, with instructions for service jobs.

IT PAYS TO KNOW

How to fit pistons—How to locate engine knocks. How to fit connecting rod bearings—How to service main bearings—How to recondition valves—How to time valves—How to adjust fan belts—How to adjust carburetors and chokes. How to rebuild a clutch—How to service automatic transmissions—How to service brakes—How to adjust steering gear—How to cope with ignition troubles—How to service distributors—How to time ignition—How to "tune up" an engine.

$4 COMPLETE • PAY $1 A MO.
TO GET THIS ASSISTANCE FOR YOURSELF SIMPLY FILL IN AND MAIL COUPON TODAY.

Step up your own skill with the facts and figures of your trade. Audels Mechanics Guides contain Practical Inside Trade Information in a Handy Form. Fully illustrated and Easy to Understand. Highly Endorsed. Check the book you want for 7 DAYS FREE EXAMINATION. Send No Money. Nothing to pay postman.

MAIL ORDER

AUDEL, Publishers, 49 W. 23 St., NEW YORK 10, N. Y.

Please send me postpaid for FREE EXAMINATION books marked x: below. If I decide to keep them I agree to mail $1 in 7 Days on each book or set ordered and further mail $1 monthly on each book or set until I have paid price, otherwise I will return them.

Check NOW!

You Can Look Over Any Guide In Your Own Home

—

Start the Easy Payments If Satisfied

MAIL THIS TODAY

- ☐ AUTOMOBILE MECHANICS GUIDE, 1800 Pages $ 4
- ☐ TRUCK & TRACTOR GUIDE, 1299 Pages . . . 4
- ☐ DIESEL ENGINE MANUAL, 575 Pages 2
- ☐ MACHINISTS HANDY BOOK, 1650 Pages . . . 4
- ☐ WELDERS GUIDE, 400 Pages 1
- ☐ BLUE PRINT READING, 416 Pages 2
- ☐ MATHEMATICS & CALCULATIONS, 700 Pages . 2
- ☐ SHEET METAL PATTERN LAYOUTS, 1100 Pages 4
- ☐ SHEET METAL WORKERS HANDY BOOK, 388 Pgs. 1
- ☐ MECHANICAL DRAWING GUIDE, 160 Pages . . 1
- ☐ MECHANICAL DRAWING & DESIGN, 480 Pages 2
- ☐ AIRCRAFT WORKER, 240 Pages 1
- ☐ TELEVISION SERVICE MANUAL, 384 Pages . . 2
- ☐ RADIOMANS GUIDE, 914 Pages 4
- ☐ ELECTRONIC DEVICES, 216 Pages 2
- ☐ ELECTRIC MOTOR GUIDE, 1000 Pages . . . 4
- ☐ ELECTRIC WIRING DIAGRAMS, 272 Pages . . 1
- ☐ ELECTRICIANS EXAMINATIONS, 250 Pages . . 1
- ☐ ELECTRIC POWER CALCULATIONS, 425 Pages . 2
- ☐ HANDY BOOK OF ELECTRICITY, 1440 Pages . . 4
- ☐ ELECTRIC DICTIONARY, 9000 Terms 2
- ☐ ELECTRIC LIBRARY, 7000 Pages (12 Book Set) 18
- ☐ MARINE ENGINEERS HANDY BOOK, 1258 Pgs. 4
- ☐ SHIPFITTERS HANDY BOOK, 250 Pages . . . 1
- ☐ REFRIGERATION & Air Conditioning, 1280 Pgs. 4
- ☐ MILLWRIGHTS & MECHANICS GUIDE, 1200 Pgs. 4
- ☐ POWER PLANT ENGINEERS GUIDE, 1500 Pages 4
- ☐ ENGINEERS & FIREMANS EXAMS, 525 Pages . 1
- ☐ PUMPS, Hydraulics & Air Compressors, 1658 Pgs. 4
- ☐ ENGINEERS LIBRARY (3 Book Set) 9
- ☐ MECHANICAL DICTIONARY, 950 Pages . . . 4
- ☐ GARDENERS & GROWERS GUIDES (4 Book Set) 6
- ☐ CARPENTERS & BUILDERS GUIDES (4 Book Set) 6
- ☐ PLUMBERS & Steamfitters Guides (4 Book Set) 6
- ☐ MASONS AND BUILDERS GUIDES (4 Book Set) 6
- ☐ PAINTERS & DECORATORS MANUAL, 450 Pgs. 2
- ☐ HOUSE HEATING GUIDE, 1000 Pages 4
- ☐ OIL BURNER GUIDE, 384 Pages 1

Name_____

Address_____

Occupation_____

Employed by _____ 44

Afraid your hair won't pass her caress test?

Grooms hair, never greases it

The proof is in the palm of your hand!

Important moment—when she runs her fingers through your hair! Will she do it once—and never again? Test *yourself*, and see. Rub your palm across your hair. Pick up an annoying film of oil or grease? If so—be warned—and change to Mennen Cream Hair Oil. Lightly blended to keep hair neatly groomed, and leave no trace. Contains lanolin. Helps remove dandruff scales and relieves dry scalp. Get a bottle today, and pass the caress test tonight!

MENNEN

Cream Hair Oil **FOR MEN**

EVERY PASSENGER TIRE
UNCONDITIONALLY GUARANTEED
plus TIRE INSURANCE FREE

Here's DOUBLE proof that we bear the loss if your passenger tire wears out within the guarantee period or is damaged in any way (except willfully). Don't take risks: we send FREE insurance certificate PLUS written unconditional guarantee with your order.

10% off ON TWO OR MORE USED TIRES

LOW COST QUALITY TIRES
Unconditional SIX MONTHS' GUARANTEE plus TIRE INSURANCE FREE

600-16, 600-15, 650-15, 550-15	650-16, 640-15, 550-16, 670-16	550-17, 475-19, 710-15, 760-15
$3.50 ea.	$3.75 ea.	$3.95 ea.

BETTER GRADE PASSENGER TIRES
UNCONDITIONAL ONE YEAR GUARANTEE plus TIRE INSURANCE FREE

600-16	$5.59	700-16	$7.59	700-15	$5.59	550-16	$5.95
600-16 (6)	6.50	600-15	5.59	750-16	12.25	550-17	5.75
650-16	5.79	650-15	5.59	550-15	5.59	475-19	5.75
640-15	5.95	710-15	6.50	820-15	7.50	760-16	7.75
670-15	5.95	760-15	6.75	670-16	6.95		

MUD AND SNOW TIRES
TWO YEAR WRITTEN GUARANTEE

600-16	$6.95	900-16	$12.95	750-20	Reg. $12.50	Spec.	$15.95
650-16	7.50	650-16 (6)	9.50	650-15	.....	.....	6.50

EXTRA VALUE TRUCK TIRES
ONE YEAR WRITTEN GUARANTEE

600-20	$10.75	750-20	$14.50	825-20	$21.50	1100-20	$26.95
650-20	11.75	32x6 (8)	11.75	900-20	19.50	1100-22	24.50
700-20	12.50	32x6 (10)	12.50	1100-20	20.00	750-20 (10)	18.00

Complete line of High Mileage Tires in stock. Write for price list for sizes not listed. All prices F.O.B. Richmond.

MAIL ORDERS PROMPTLY FILLED. Send check or money order with this ad.

THE SAFTYRE CO., INC.
"FOR THAT SAFE TIRE"
Dept. PS, 1801 East Broad Street, PO Box 2254, Richmond, Va.

TASOPE PHOTO-ENGRAVING PLANTS

MATERIAL COST OF THIS CUT ¼¢ SELLING PRICE $1.00 AND UP

Establish your own profitable PHOTO-ENGRAVING business. Make cuts for newspapers, printers, and advertisers. Make etched name plates, plaques etc. Instructions furnished, no experience necessary. Sold direct from factory since 1931. First five hundred cuts sold locally or by mail will pay for plant and pay you well for your time. Write for FREE catalog.
TASOPE DEPT. PS-7 AURORA, MO.

OWN a Business

If employed, start part time. Alert dealers can gross $5 hourly profit on own service plus $3 on EACH serviceman. Clean, revive, mothproof rugs & upholstery on location. No shop needed. Services nationally advertised. Repeat customers. Easy to learn. Quickly established. Easy terms. Send today for FREE booklet. No obligation.

Duraclean Co., 2-187 Duraclean Bldg., Deerfield, Ill.

MASTER MIND!

Learn Short-Cut Mathematics

Juggle figures, do baffling number tricks. Make people gasp at your marvelous *lightning-quick* mind. Multiply 4 figures by 4 figures without using old-fashioned multiplication! Big cloth-bound volume; fully illustrated course.

Sharpen up Your Brain Power

Includes worked-out problems, answers, etc. Sensational bargain, only $1.95, postpaid or COD plus postage. Satisfaction guaranteed or refund. Order this amazing "Short-Cut Mathematics" today!

NELSON-HALL CO., 210 S. Clinton St. Chicago 6, Ill.
Dept. 4-GY-1

$1.95 Complete

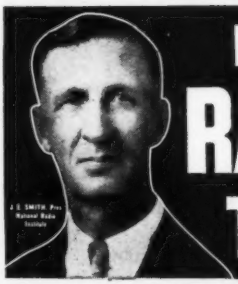
$5000.00 IN PRIZES

DRAW MY HEAD

1st & 2nd PRIZES
COMPLETE $130 ART COURSE
80 OTHER VALUABLE PRIZES
Your Drawing Judged and Answered

Take this test and try for a thrilling prize. Discover if you have profitable Art talent. You may gain a lifetime of happiness and high earnings if you mail your drawing today. Amateurs only. Our present students not eligible. Copy this girl 4" to 6" high in pen or pencil. Mail to us. None returned. Winners notified. New $5,000 contest each month. Your drawing will be entered in Contest for month in which we receive it. Send your drawings now with your name, address, age and occupation. Enter today.

WALLER ART EXCHANGE Studio 99, 1000 N. Charles St. Baltimore 1, Maryland



BE A SUCCESS AS A RADIO-TELEVISION TECHNICIAN

2 FREE BOOKS SHOW HOW MAIL COUPON

America's Fast Growing Industry Offers You

EXTRA PAY IN ARMY, NAVY, AIR FORCE

If you expect to go into military service, mail coupon NOW. Knowing Radio, TV, Electronics can help you get extra rank, extra prestige, more interesting duty at pay up to several times a private's basic pay. You are also prepared for good Radio-TV jobs upon leaving service. IT'S SMART TO TRAIN WITH N. R. I. NOW. Mail Coupon TODAY.

I TRAINED THESE MEN

Shop Specializes in Television. "Have my own shop. Am authorized serviceman for 5 large manufacturers, do servicing for 7 dealers. N. R. I. enabled me to build enviable reputation." P. MILLER, Maumee, Ohio.

NRI Graduate Doubles Salary. "Am with Station WKBO as transmitter operator. More than doubled salary since starting in Radio full time. N. R. I. has been helpful to me." A. HERR, New Cumberland, Pa.

$10 Week in Spare Time. "Before finishing course, I earned as much as $10 a week in Radio servicing in spare time. I recommend N. R. I. to everyone who shows interest in Radio." S. J. PETRUFF, Miami, Florida.

Gets First Job Through N.R.I. "My first job was operator with KDLR, obtained for me by your Graduate Service Dept. I am now Chief Eng. of Police Radio Station WQOX." T. S. NORTON, Hamilton, Ohio.

1. EXTRA MONEY IN SPARE TIME

Many students make $5, $10 a week extra fixing neighbors' Radios in spare time while learning. The day you enroll I start sending you SPECIAL BOOKLETS to show you how to do this. Tester you build with parts I send helps you service sets. All equipment is yours to keep.

2. GOOD PAY JOB

Your next step is a good job installing and servicing Radio-Television sets or becoming boss of your own Radio-Television sales and service shop or getting a good job in a Broadcasting Station. Today there are over 90,000,000 home and auto Radios. 3100 Broadcasting Stations are on the air. Aviation and Police Radio, Micro-Wave Relay, Two-Way Radio are all expanding, making more and better opportunities for servicing and communication technicians and FCC licensed operators.

3. BRIGHT FUTURE

And think of the opportunities in Television! In 1950 over 5,000,000 Television sets were sold. By 1954 authorities estimate 25,000,000 Television sets will be in use. Over 100 Television Stations are now operating, with experts predicting 1,000. Now is the time to get in line for success and a bright future in America's fast-growing industry. Be a Radio-Television Technician. Mail coupon for Lesson and Book—FREE.

I Will Train You at Home

Read How You Practice Servicing or Communications with Many Kits of Parts You Get!

I send you many valuable Kits of parts for PRACTICAL EXPERIENCE. They "bring to life" theory you learn in my illustrated texts. As part of my Servicing Course, you build a complete, powerful Radio Receiver, a Multitester useful in earning extra spare time money, AM and FM Signal Generator, etc. In my Communications Course, you assemble a low-power Broadcasting Transmitter that shows you how to put a station "on the air," a Wavemeter, etc. This and other equipment I send you, is yours to keep.

Keep your job while training at home. Hundreds I've trained are successful RADIO-TELEVISION TECHNICIANS. Most had no previous experience; many no more than grammar school education. Learn Radio-Television principles from illustrated lessons. Get PRACTICAL EXPERIENCE—build valuable Electronic Multitester for conducting tests; also practice servicing Radios or operating Transmitters—experiment with circuits common to Radio and Television. At left is just part of the equipment my students build with many kits of parts I furnish. All equipment is yours to keep. Many students make $5, $10 a week extra fixing neighbors' Radios in spare time.

Mail Coupon For 2 Books FREE

Act Now! Send for my FREE DOUBLE OFFER. Coupon entitles you to actual lesson on Servicing; shows how you learn Radio-Television at home. You'll also receive my 64-page book, "How to Be a Success in Radio-Television." You'll read what my graduates are doing, earning; see photos of equipment you practice with at home. Send coupon in envelope or paste on postal. J. E. SMITH, Pres., Dept. 2GB National Radio Institute, Washington 9, D. C. . . . Our 38th year.

Good for Both—FREE

Mr. J. E. SMITH, President, Dept. 2GB
National Radio Institute, Washington 9, D. C.

Mail me Sample Lesson and 64-page Book about How to Win Success in Radio-Television. Both FREE. (No salesman will call. Please write plainly.)

Name ..... Age .....

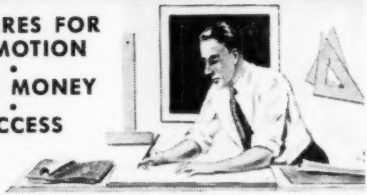
Address .....

City ..... Zone ..... State .....

Approved Under G. I. Bill

C. T. C. TRAINING IN
DRAFTING

PREPARES FOR PROMOTION • MORE MONEY • SUCCESS



"Here I am at work making good money as a draftsman. I'm glad I sent the coupon to Chicago Tech for that Free Trial Lesson and found out how easy it is to learn Drafting in spare time at home. Today, I feel secure in my job. What's more, I feel I'm slated for promotion and more pay."

LEARN IN SPARE TIME—AT HOME!

(or at the College in Chicago)

A few hours of pleasant home study every week—that's all. All the tools you need; drawing outfit included. This tested method—developed over 48 years of C.T.C. progress—prepares men quickly for good positions in industry.

FREE INFORMATION — SEND COUPON

To prove to you how easy it is to learn Drafting at home by the Chicago Tech method, we will send you this FREE TRIAL LESSON. No charge for this lesson, now or later. Fill out and mail coupon, or send post card today.

CHICAGO TECHNICAL COLLEGE

H-220 Tech Bldg., 2000 So. Michigan Ave., Chicago 16, Illinois

Mail me FREE Lesson with information about big opportunities in DRAFTING.

Name.....Age.....

Address.....

City.....Zone....State.....

323 Different STAMPS – 25¢

includes the most famous stamp ever issued: SPAIN

GOYA NUDE

What a terrific collection! 323 *all-different* stamps from all over the world, including hard-to-get stamps such as: ALBANIA—Churchill, F.D.R. Liberation; UNITED NATIONS—very first stamp issued; MONACO—giant Pope Pius triangles; GERMANY—Allied Military Gov't cpl. (9); FRANCE—Anti-Communist bicolors cpl.; KOREA—Pyongyang Provisionals; U.S.A.—$1-$5 1931 top values; *plus hundreds more* at amazing bargain rate of 13 stamps for 1c! It's a regular $3.50 value—yet yours for 25c with our Bargain Approvals. Money back if not delighted.

FREE **MIDGET ENCYCLOPEDIA OF STAMP COLLECTING**—includes Stamp Dictionary, Stamp Identifier (shows what country any stamp comes from), sensational Bargain Offers:

SEND 25c TODAY **ASK FOR LOT EH3**

ZENITH CO., 95 NASSAU ST., NEW YORK 38, N. Y.

Count Telegraph Wires in the Distance

20 POWER *All Purpose* TELESCOPE

A REAL BARGAIN

WEIGHS ONLY 7½ OUNCES!

2½ times stronger than binoculars used by U. S. Armed forces! **Whisper Weight** 7½ ounces. Easy to hold—Easy to focus—for instant on-the-spot focusing. Ideal for indoor, outdoor sports, vacationing, trips, long distance spotting. Pocket size—measures only 6¼" closed—13½" open. **NOT A CHEAPLY MADE TOY TELESCOPE!** But an **all metal**, precision machined (threaded fittings throughout) precision ground, **achromatic** telescope that invites comparison. Bears the famous UNITED **"Seal of Quality"** because they are UNI-COATED, assuring buyers that an application of magnesium fluoride has been applied to the interior sides of the VITAL front Achromatic and rear Ocular lenses so users can view distant objects (even those miles away) clearer, brighter and in sharper detail than ever before. Made in American occupied Japan where skilled German optical craftsmen tutored local optical workmen in advanced techniques. It explains why the quality is so high and the price so low. UNCONDITIONALLY GUARANTEED. Try for 30 days. If not absolutely satisfied in every way return for an immediate unquestioned refund of your money. Introductory price $8.95 (tax free)! Cash orders postpaid. C.O.D.'s include $2.00 deposit.

UNITED BINOCULAR CO.
9043 S. WESTERN AVE. DEPT ARF-6916 CHICAGO 20

Watch Repairing Pays Big Money Learn at home

Watch repairers in great demand. Train step-by-step in 10 easy lessons. We furnish all tools and 15 jewel watch and practice movement. Turn spare time into cash. A licensed school. Low cost. Send for FREE book today.

ILLINOIS SCHOOL OF WATCH REPAIRING
2870 Elston Ave., Dept PS-72, Chicago 18, Ill.

LEATHERCRAFT and many other crafts

SHELLCRAFT • easy to do **TEXTILE PAINTING • profitable too**

Send for FREE BIG CATALOG TODAY

• complete supplies **• everything you need**

KIT KRAFT • 7373 Melrose Ave., Dept. 39, Hollywood 46, Calif.

"How to Make Money with Simple Cartoons"

A book everyone who likes to draw should have. It is free; no obligation. Simply address

FREE BOOK

CARTOONISTS' EXCHANGE
Dept. 197D Pleasant Hill, Ohio

BUILD A $15,000 A YEAR FUTURE!

In the exciting new business of

LAUNDERING VENETIAN BLINDS

Send name, get pictures, profits, prices, facts—all Free—showing how to start on small investment in basement or garage. Big demand—high profits—spare or full time. Others NOW MAKING **$15,000 a year.**

FREE! Learn all about machine and easy time-pay plan. Get names of successful men near you so you can investigate. Rush name now.

VENETIAN BLIND LAUNDRY EQUIPMENT CO., Inc.
442 North Seneca Street, Dept. 127 Wichita 12, Kansas

LEARN

ELECTRICITY AND ELECTRONICS

ON REAL EQUIPMENT

IN THE GREAT SHOPS OF COYNE

ALSO TRAINING IN

RADIO-TELEVISION

Plays a Vital Roll in Nation's Defense

The tremendous growth of this new field is almost unbelievable. New stations are rapidly bringing television to all parts of the country. RADIO—TELEVISION and ELECTRONICS are vital to our Defense Program. Unusual opportunity to get in on ground floor of this vital field that also offers a world of opportunities for a real future when the emergency is over. **Train quickly** on actual equipment **at Coyne** by practical-technical methods. Get big Free Book today.

ELECTRICITY—

The Power Behind Our Defense Program

A great opportunity field and vital to Defense. Thousands of trained Electrical men needed in good jobs with a real future when the emergency is over. Why be satisfied with a "no future" job? Get Free Book that tells how thousands have prepared quickly for a good job with a real future in Electricity at Coyne.

TRAIN QUICKLY AT COYNE FOR VITAL FIELDS

ELECTRICITY-RADIO-TELEVISION-ELECTRONICS-VITAL in Industry and Armed Forces. TRAIN QUICKLY for better rating, if drafted—vital job in Industry, if not. Trained men whether 16 or up to 50 needed. Many men with physical handicaps can qualify. Prepare now for steady, well paid, essential jobs in A FIELD THAT ALSO OFFERS A REAL FUTURE WHEN THE EMERGENCY IS OVER.

Not "Home-Study"

We do not teach by mail. All training is given in our Great Training Shops in Chicago, plus necessary theory. No advanced education or previous experience needed.

START NOW—PAY LATER

Enroll now, pay most of tuition later. If you need part-time work to help out with living expenses while at **Coyne**, we'll help you get it. **G.I. approved.**

1 You are TOLD the how and why of each job.

2 You're shown how to do typical jobs by trained instructors.

3 You DO practical job YOURSELF on equipment.

Mail Coupon for Big FREE BOOK

Whether you prefer Electricity or Television-Radio, train on actual equipment, at Coyne. Fill in and mail coupon TODAY. Paste it on a penny postcard if you wish. A big fully illustrated booklet and complete details will come by return mail. No salesman will call.

B. W. COOKE, President

COYNE SCHOOL

A TECHNICAL TRADE INSTITUTE
CHARTERED NOT FOR PROFIT
Established 1899
500 S. Paulina, Dept. B2-73H
Chicago 12, Illinois

ELECTRICITY ★ TELEVISION ★ RADIO ★ REFRIGERATION ★ ELECTRONICS

B. W. COOKE, President
COYNE SCHOOL
500 S. Paulina St., Chicago 12
Dept. B2-73H

Send your BIG FREE BOOK and details of your training offer. This does not obligate me and **no salesman will call.** I am interested in

☐ ELECTRICITY ☐ TELEVISION-RADIO

NAME.....

ADDRESS.....

CITY.....STATE.....

VOTE TODAY

FOR THE FUTURE YOU WANT!

AMERICAN SCHOOL,
Dept. GB46, Drexel at 58th, Chicago 37, Ill.
Without obligation, please send FREE and postpaid, full particulars about the subject checked below.

- ☐ Accounting
- ☐ Air Conditioning
- ☐ Architecture & Building
- ☐ Automotive Technician
- ☐ Better Foremanship
- ☐ Bookkeeping
- ☐ Business Management
- ☐ Contracting
- ☐ Diesel Technician
- ☐ Drafting—Building Trades
- ☐ Drafting—Machine Trades
- ☐ Electrical Engineering
- ☐ Electricity—Practical
- ☐ Electronics—Industrial
- ☐ High School Courses
- ☐ Machine Shop Operations
- ☐ Mathematics & Slide Rule
- ☐ Mechanical Engineering
- ☐ Plastics Engineering
- ☐ Plumbing—Practical
- ☐ Private Secretary
- ☐ Refrigeration
- ☐ Retail Merchandising
- ☐ Salesmanship—Outside
- ☐ Sheet Metal Work
- ☐ Tool Making

Name ..... Occupation .....
Home Address ..... Age .....
City ..... State .....

THIS IS YOUR BALLOT

Find the subject that interests you most and then... Check, Sign and Mail Today

• *Today*, choose the job you want — and prepare for it in spare time at home. Or if you are already engaged in the work you like best, start training *now* for quicker promotion. In hours you might otherwise waste, gain the knowledge and skill that can help you to get ahead faster, make more money, and have greater security.

Training Backed by 55 Years of Experience

For over half a century American School has helped ambitious men and women toward success by providing specialized training for commercial and technical advancement. Its study program for *you* has been planned by experts with years of experience in the subject you select and they will give you needed guidance every step of the way.

Don't Delay Your Start

Give serious thought to the list of training courses listed above. Pick the opportunity that interests you, check it and add your name and address. (Check more than one if you are undecided as to which appeals most.) Finally clip out and mail the "ballot" and full information will be supplied, without cost or obligation.

AMERICAN SCHOOL
DEPT. GB46, DREXEL AT 58th, CHICAGO 37, ILL.

THE SOONER YOU START, THE SOONER YOUR GOAL CAN BE REACHED

LIFETIME WRITTEN GUARANTEE!
17 JEWEL WRIST WATCH 14.95 Plus 1.39 Tax

WAR ON PRICES!

FORMERLY SOLD FOR $59
INCABLOC SHOCK PROTECTED
WATER & DUST PROOF

Worn by ARMY, NAVY & MARINES
Luminous dial . . . sweep second hand . . . Super Accurate. Imported Swiss precision movement and case. You get these brand new LIFETIME GUARANTEED watches now for a small fraction of the original price. You save $44, because we bought-out surplus stock! Don't delay.

10 DAY FREE TRIAL!
WEAR AT OUR RISK!
MONEY BACK IF NOT DELIGHTED.
SEND ONLY $1 DOWN PAYMENT with order. Pay balance to postman on arrival plus postage. Send check or M.O. for full amount and we pay postage. Men's Style $14.95 plus $1.50 tax, total $16.45. Ladies and nurses style $16.95 plus $1.70 tax, total $18.65. Order now at this low price.

SAVE $44

NURSES MODEL $16.95 Plus Tax

FREE! Handsome Expansion Band with Order
MARYLAND DISTRIBUTORS, Dept. 392
501 E. Baltimore Street, Baltimore-2, Maryland
Write For Free Watch And Jewelry Catalog at Almost Wholesale Prices

REAL ESTATE
BE A BROKER

PAYS BIG! SEND FOR FREE, BIG, ILLUSTRATED CATALOG NOW! Graduates report making substantial incomes. Start and run your own business quickly. Men, women of all ages, learn easily. Course covers Sales, Property Management, Appraising, Loans, Mortgages, and related subjects. STUDY AT HOME or in classrooms in leading cities. Diploma awarded. Write TODAY, for free book! No obligation.

FREE BOOK TELLS HOW

WEAVER SCHOOL OF REAL ESTATE (Est. 1936)
Suite 300 Law Bldg. Dept. PS Kansas City, Mo

GET TOP PAY JOBS IN TELEVISION-ELECTRONICS

Our TWO FREE BOOKS show you HOW!
Earn extra money or start your own business.
Ask for FREE television books. Write Dept. R-17

RADIO TELEVISION TRAINING ASSOCIATION
(State age) 1629 Broadway, New York 19, N.Y.

TALK—SING—PLAY
OVER YOUR RADIO
with the real Radio Mike! Attaches in a jiffy—full instructions given! Swell for "parties"—"cut in" on or "kid" regular network programs or put on your own broadcasts! Amaze your friends—real fun. Beautiful Metallic Plastic 6 in. high!
12 RADIO BROADCAST LESSONS GIVEN with each mike
SEND NO MONEY Just pay postman $3.99 COD plus postage or send $3.99 and we pay postage! *Radio Mike* is available *only* from us by mail—*guaranteed*.
Midway Co., Dept. MPS-7, Kearney, Nebr.

Illustrated
BOOKLETS

HERE THEY ARE, illustrated comic booklets just off the press. Good clear illustrations. Send $1 for 12 booklets and receive FREE two of the larger size 32 page books. Rush a buck for all 14 books to,

AL'S PRINT SHOP
216-D W. JACKSON BLVD. CHICAGO, ILL.

INVENTORS

Learn how to protect your invention. The U. S. Patent Laws provide that any new and useful art, machine, article of manufacture, or composition of matter, or any new and useful improvement thereof, may be patented if the act of invention is involved. Therefore, every inventor with a valuable invention should take advantage of the Patent Laws and proceed for patent protection in order to safeguard his rights.

A patent gives the inventor the exclusive right to prevent others from making, using, or selling the invention claimed in the patent for a period of seventeen years.

The Patent Laws were enacted for the benefit of the inventor to give him protection for the features of his invention which are patentable. These features must be properly and concisely set forth and claimed in a formal application for patent, in order to comply with the requirements of the Patent Laws. For that reason, unless the inventor is familiar with patent matters, he should engage a competent registered patent attorney or agent to represent him. We are registered to practice before the U. S. Patent Office and are prepared to serve you in the handling of your patent matters.

A specially prepared booklet entitled "Patent Guide for the Inventor", containing detailed information with respect to patent protection and procedure, together with a "Record of Invention" form will be promptly forwarded to you without obligation upon request.

CLARENCE A. O'BRIEN & HARVEY JACOBSON

Registered Patent Attorneys

22-G DISTRICT NATIONAL BUILDING

WASHINGTON 5, D. C.

I GAINED 53 LBS. OF SHAPELY POWER-PACKED MUSCLES

Roger Hirsch now

Which of these **2 ME'S is YOU?**

THAT 112 LB.-6 FT. SPINDLE-ARMED **SISSY** below WAS ME A FEW SHORT WEEKS AGO

Roger Hirsch before

NO! friend you don't have to be SKINNY any more just mail NOW the FREE coupon below as I did. Soon YOU can add

6½ inches to your **CHEST**
3 inches to each **ARM**

and the rest in proportion just as I did.

You Can WIN
This 15" tall SILVER TROPHY
As I Did in 10 MINUTES of Fun a Day!

Come on, PAL, NOW YOU GIVE ME

10 PLEASANT MINUTES A DAY IN YOUR HOME ...AND I'LL GIVE

YOU a NEW HE-MAN BODY For Your OLD SKELETON FRAME.

says *George F. Jowett*
World's Greatest Builder of HE-MEN

GEORGE F. JOWETT "Champion of Champions" 4 times Winner Perfect Man Contest

NO! I don't care how skinny or flabby you are; if you're a teen-ager, in your 20's or 30's or over; if you're short or tall, or what work you do. All I want is JUST 10 EXCITING MINUTES in your home to MAKE YOU OVER by the SAME METHOD I turned myself from a wreck to a Champion of Champions.

YES! You'll see INCH upon INCH of MIGHTY MUSCLE added to YOUR ARMS. Your CHEST deepened. Your BACK AND SHOULDERS broadened. From head to heels, you'll gain SOLIDITY, SIZE, POWER, SPEED! You'll become an ALL-Around, ALL-American HE-MAN, A WINNER in everything you tackle—or my Training won't cost you one solitary cent.

THIS MAY BE YOUR LAST CHANCE TO GET ALL 5 PICTURE PACKED COURSES FOR 10¢ MILLIONS HAVE BEEN SOLD FOR $1 AND MORE

Develop YOUR 520 MUSCLES
Gain Pounds, INCHES, FAST!

Friend, I've traveled the world. Made a LIFE-TIME STUDY of every way known to develop your body. Then I devised the BEST by TEST, my "5-WAY PROGRESSIVE POWER" the only method that builds you 5-ways fast. You save YEARS, DOLLARS like movie star Tom Tyler did. Like champ Roger Hirsch did. Like MANY THOUSANDS like you did. SO Mail coupon NOW!

FREE

BOTH FREE FOR QUICK ACTION!
1. Photo Book of STRONG MEN 2. MUSCLE METER

"Jowett Courses greatest in World for Building All-Around HE-MEN" —R. F. Kelley Physical Director

JOWETT INSTITUTE OF PHYSICAL TRAINING
230 FIFTH AVENUE, NEW YORK 1, N. Y. Dept. PS-27

Dear George: Please mail to me FREE Jowett's Photo Book of Strong Men and a Muscle Meter, plus all 5 HE-MAN Building Courses: 1. How to Build a Mighty Chest. 2. How to Build a Mighty Arm. 3. How to Build a Mighty Grip. 4. How to Build a Mighty Back. 5. How to Build Mighty Legs—Now all in One Volume "How to become a Mighty HE-MAN." ENCLOSED FIND 10c FOR POSTAGE AND HANDLING (no C.O.D.'s).

NAME.....AGE.....
ADDRESS.....
CITY.....ZONE.....STATE.....

No Experience Needed To
PRINT YOUR OWN POST CARDS

The GEM STENCIL DUPLICATOR saves money . . . gets results quickly! Hundreds of uses for every type of business and organization. We ship the GEM complete with all supplies, Guide Board for accurate printing and 60-page Book of Ideas at the special low price of only **$8.50** (a $15 value)

Our 21st Year

FREE TRIAL OFFER

Use the GEM **FREE** at our expense! SEND NO MONEY. Write and complete GEM outfit will be sent you postpaid. After ten days, send us only **$8.50** or return the GEM. You must be satisfied!

BOND EQUIPMENT CO. Dept. 49
6633 Enright • St. Louis 5, Mo.

NOW LEARN **TV-RADIO Servicing** AT HOME!

EARN WHILE YOU LEARN
No previous training needed . . . new simplified lessons! Top instruction . . . one of the largest schools of its kind!

PAY AS LITTLE AS **$5** mo.
TOTAL COST AS LOW AS **$100**

Write Today For Free Sample Lesson and Details. Dept. A-7

CRESCENT SCHOOL
500 PACIFIC ST. • BROOKLYN 17, N. Y.

ENORMOUS PROFITS CASTING AT HOME

Write today for NEW FREE CATALOG

Learn to cast thousands of perfect figurines, plaques, book ends, ash trays, etc. Start **NOW—NO EXPERIENCE LITTLE CAPITAL** needed. Earn **GREAT PROFITS** with **X.L. RUBBER MOLDS.** X.L. Rubber, Pts. **$2.50**, Qts. **$4.00** (postage extra)! Models and enough rubber for 3 molds . . . **$1.50** postpaid.

PLASTIC ARTS STUDIO 3403 S. Madison St. Dept. 3 MUNCIE, IND.

TREASURE -- $10,000

New locator detects metals, valuable minerals and buried treasure. Money-back guarantee of superiority.

Also geiger counters. Govt. reward of $10,000 for uranium discovery. Write for FREE information.

THE GOLDAK COMPANY
1544 W. GLENOAKS BLVD., GLENDALE 1, CALIF.

LEARN MEAT CUTTING

through actual practice. Profitable Meat Cutting and Self Service Meats taught easily, quickly. LEARN BY DOING at Toledo in just eight short weeks under actual market conditions. For beginners or men with experience. All subjects taught thoroughly and completely. Diploma. Job help. Get store of own. People must eat. School in operation over 25 years. Approved for GI training. Send today for FREE illustrated catalog. No obligation.

NATIONAL SCHOOL OF MEAT CUTTING, Dept. 51-G, Toledo 4, Ohio

HYPNOTIZE

Yes. Anyone. Modern speed hypnotism taught. Methods revealed. You are shown exactly what to say and do. Photo illustrated. Many interesting experiments. Self-hypnosis is fully explained. Amazing results. Detailed hypnotic tests given. Learn this exciting fascinating art. Hold your friends absolutely spellbound. Entertain.

A professional hypnotist tells you his secrets.

Free catalog of new hypnotism books sent on request.

Send for the startling book "HYPNOTISM REVEALED" → **$1**

78 RPM Phonograph Record Inducing Self-Hypnosis & Group-Hypnotism → **$5**

Thought of using sleep for learning, self-development? Send for new intriguing book, "Mental Power Through Sleep Suggestion." → **$1**

These books are also available at all bookstores & public libraries.

MELVIN POWERS, Master Hypnotist, 1314 Wilshire, Dept. 91, Hollywood 17, Calif.

INVENTORS

If you believe that you have an invention, you should find out how to protect it. The first step is to have a search made of the prior pertinent U. S. patents. If a report on this search indicates that the invention appears patentable you can apply for a patent, and the specifications and claims should be prepared.

The firm of McMorrow, Berman & Davidson, with offices in Washington, D. C., is qualified to take the necessary steps for you. We can make a preliminary search on your invention, advise you whether we think it can be patented, and prepare your application for patent.

Unless you are fully familiar with the U. S. Patent Laws, we recommend that you engage the services of a Registered Patent Attorney to protect your interests. The patent laws are *your* laws. A patent gives you the right to prevent others from making, using or selling the invention claimed in your patent for a period of 17 years.

Use these patent laws for your protection. Investigate whether your invention can be patented. If you have what you believe to be an invention, we suggest that you have this firm make a search for you.

Send for a copy of our Patent Booklet entitled "How To Protect Your Invention," containing information about patent protection and patent procedure. Along with this we will also send you an "Invention Record" form, for your use in writing down and sketching details of your invention. We will mail them promptly. No obligation. They are yours for the asking.

McMORROW, BERMAN & DAVIDSON

Registered Patent Attorneys

PATENTS • COPYRIGHTS • PATENTS

1428 VICTOR BUILDING, WASHINGTON 1, D. C.

DETROIT PUBLIC LIBRARY

GET THE WORLD'S LEADING

RADIO & TV CATALOG

★

FREE

★

1952

212-Page Edition

★

ALLIED'S

BIG COMPLETE BUYING GUIDE

Save on Everything in Radio and TV

NEW

UP-TO-DATE SEND FOR IT NOW

Everything for Experimenters, Builders, Amateurs, Servicemen, Engineers and Soundmen

Send for ALLIED's 212-page 1952 Catalog, the value-packed guide to *everything* in Radio and Television! Latest home radios, TV equipment, Amateur supplies, P.A. Systems, Hi-Fidelity Sound, recorders, test instruments, builders' kits—plus the world's largest stocks of electronic parts, tubes, tools, books and diagrams. Get more for your money—send today for your FREE 1952 ALLIED Catalog!

Get Radio's Leading Buying Guide Today

FREE!

ALLIED RADIO

ALLIED RADIO CORP., Dept. 7-G-2
833 W. Jackson Blvd., Chicago 7, Ill.

☐ Rush FREE 1952 ALLIED 212-Page Catalog.

*Name*_____

*Address*_____

*City*_____ *Zone*_____ *State*_____

MONTH AFTER MONTH, YEAR AFTER YEAR, YOU SEE OUR AD.
REMEMBER IT'S DANGEROUS to pay less if you want the finest nonskid USED tires.

GOODYEAR Firestone

GOODRICH, UNITED STATES, GENERAL, & OTHERS, NOT RECAPS

Our policy is to select your tires so carefully, as if our very future depended on the service given by that particular tire.

FREE TUBE WITH EVERY GOOD GRADE AND FINEST GRADE TRUCK AND PASSENGER TIRE

GOOD GRADE TIRES 16 MONTHS GOLDEN RULE GUARANTEE

600-16	$4.14	820-15	$5.44	600-20	$7.14	32x6(8)	$8.64
650-16	5.42	700-15	4.54	650-20	7.94	32x6(10)	9.94
700-16	5.04	670-15	4.74	700-20	8.54	900-20	13.94
650-15	4.44	710-15	4.94	750-20	8.64	1000-20	13.94
760-15	5.04	550-17	4.64	825-20	15.92	1100-20	14.94

FINEST GRADE, 29 MONTHS GOLDEN RULE GUARANTEE BOND
THIS GRADE MADE THE BLATT NAME "WORLD FAMOUS"

600-16	$5.29	700-16(6)	8.75	6 to 14 PLY TRUCK TIRES			
600-16(6)	7.85	550-15	5.60	700-15(6)	$10.00	700-20	$11.64
650-16	6.12	640-15	5.65	750-16(8)	9.90	750-20(8)	12.60
650-16(6)	8.85	670-15	5.95	750-16	10.75	750-20(10)	16.54
700-16	6.42	710-15	6.17	750-17	13.02	825-20	19.85
750-16	7.75	760-15	6.27	750-15	19.08	900-20	18.35
525-18	4.92	800-15	6.84	825-15	25.12	1000-20	17.95
550-17	5.6-	820-15	6.80	600-20	9.40	1100-20	17.95
650-15	5.60	670-16	6.42	650-20	9.80	1200-20	24.64
700-15	6.05	760-16	6.94	32x6(8)	12.25	1000-22	17.10
WHITEWALLS $2 ea. EXTRA				32x6(10)	12.02	1100-22	19.95

Buy THE "Right" TRUCK TIRES For "Your" Job 8-10-12-14-Ply DEPEND ON US

Std. Guar. 16 Mos. Rugged MILITARY MUD-SNO TREAD		Guar. 30 Mos.
750-20	$10.	750-20Rg. $16.64
600-16 Std.	6.75	600-16Rg. 9.95
900-16 Std.	10.	900-16Rg. 16.00

BLATT BLATT BLDG., GIRARD & LANCASTER AVES. DEPT. PS, PHILADELPHIA 31, PA.

Send check or money order. Send this ad with order. We won't ship a tire we wouldn't use. The name to trust in rubber.

Shipments RUSHED Down South. Up North and Far West

EARN MORE MONEY

Train for an exciting career in professional photography! Study at home in your spare time. You don't need a high school diploma. Everyday common sense is all you need to understand the simple, down-to-earth, fully illustrated and diagrammed lessons in the famous NYI Home Study Course. 90 ways to Earn While You Learn! Let us show you our success-tested method. Write for your copy of our big colorful book today. Personal attendance courses in New York. 42nd Year.

N. Y. INSTITUTE OF PHOTOGRAPHY

Dept. "5" 10 W. 33rd St., New York 1, N. Y. CH 4-3462

Learn UPHOLSTERING

FOR FULL OR SPARE TIME PROFIT

Easy to learn at home! Easy to start a shop, or earn spare-time profits! Complete tool set, all materials to build ottoman, included with lessons. Low terms. *Write for valuable booklet today!*

COMMERCIAL TRADES INSTITUTE

1400 Greenleaf Ave. • Chicago 26 • Dept. U1-7

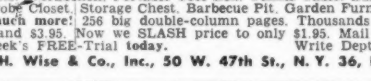
$1,000.00 Worth of Furniture for Cost of Materials Alone!

Make over $1,000 worth of furniture for indoors and out with help of amazing new book "WISE HOME FURNITURE BUILDER." Over 500 pictures, plans, and step-by-step instructions. No special tools or experience needed. **Save $10.00 to $200.00** on Tool Cabinets, Workbench, Portable Tool Box, Tennis Table, Built-In Wardrobe Closet, Storage Chest, Barbecue Pit, Garden Furniture **and much more!** 256 big double-column pages. Thousands paid $2.95 and $3.95. Now we SLASH price to only $1.95. Mail card for week's FREE-Trial **today.** Write Dept. 807

Wm. H. Wise & Co., Inc., 50 W. 47th St., N. Y. 36, N. Y.

HOBBYISTS—SEE HERE—

DENTAL INSTRUMENTS ALL 8 ONLY **$1.98**



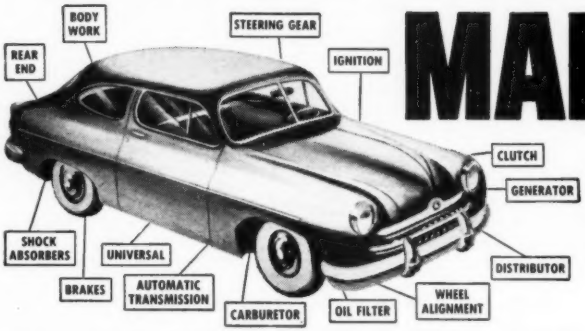
IDEAL for working in plastic, wood, leather, clay, plaster, etc., or as scribers. Many other uses—overall length 6"—Government Surplus—all new!

150 Piece HOBBY MIX for elec. Grinders . . . & mere 98c

Parcel Post and Handling 25c for 1 item. 35c for 2 items. Write for FREE CATALOG of Government Surplus Bargains.

Dental Specialty & Sales Co., Dept. PSI. P.O. Box 692, Great Neck, N.Y.

CAR REPAIRS NOW MADE EASY



Here's How To Fix Any Part of Any Car

Now — Whether You're a Beginner or Expert Mechanic — You Can "Lick" Any Auto Repair Job! Giant Guide Shows HOW — with 2400 Pictures and Step-by-Step Instructions

YES, fixing cars is a "cinch" when you have MOTOR'S BRAND-NEW AUTO REPAIR MANUAL! You just turn to the handy index, follow the clear, illustrated instructions and—Presto! the job is done. Covers everything from simple carburetor adjustment to complete overhaul — *INCLUDES EVERY CAR FROM 1935 thru 1952.*

BRAND-NEW EDITION! USED BY U. S. ARMY & NAVY

Over 2,000 Pictures! So Complete, So Simple, You CAN'T Go Wrong!

NEW REVISED Edition covers everything you need to know to repair 851 car models. 780 giant pages, 2400 "This-Is-How" pictures. Over 200 "Quick-Check" charts — more than 38,000 essential repair specifications. Over 225,000 service and repair facts. Instructions and pictures are so clear you *can't* go wrong!

Even a green beginner mechanic can do a good job with this giant manual before him. And if you're a top-notch mechanic, you'll find short-cuts that will amaze you. No wonder this guide is used by the U. S. Army and Navy! No wonder hundreds of thousands of men call it the "Auto Repair Man's Bible"!

Meat of Over 170 Official Shop Manuals

Engineers from every automobile plant in America worked out these time-saving procedures for their own motor car line. Now the editors of MOTOR have gathered together this wealth of "Know-How" from over 170 Official Factory Shop Manuals, "boiled it down" into crystal-clear terms in one handy indexed book!

Try Book FREE 7 Days

SEND NO MONEY! Just mail coupon! When the postman brings book, pay him nothing. First, make it show you what it's got. Unless you agree this is the greatest time-saver and work-saver you've ever seen—return book in 7 days and pay nothing. Mail coupon today! Address: *MOTOR Book Dept., Desk* 2 H, *250 West 55th Street, New York 19, N. Y.*

Covers 851 Models—All These Makes

Buick	De Soto	Hudson	Mercury	Plymouth
Cadillac	Dodge	Kaiser	Nash	Pontiac
Chevrolet	Ford	Lafayette	Nash Rambler	Studebaker
Chrysler	Frazer	La Salle	Oldsmobile	Terraplane
Crosley	Henry J	Lincoln	Packard	Willys

Also tune-up adjustments for others

Same FREE Offer on MOTOR'S New Truck and Tractor Manual

BRAND-NEW Edition! Covers EVERY job on EVERY popular-make gasoline-powered truck and farm tractor made from 1936 thru 1952. Over 1400 pictures, 925 pages, 300,000 facts. FREE 7-DAY Trial. Check proper box in coupon.

Just a Few of the Many Letters of Praise

"Fixed motor another mechanic had worked on half a day. With your Manual I did it in 30 minutes."
—*C. AUBERRY, Tenn.*

"MOTOR'S Manual paid for itself on first 2 jobs, and saved me valuable time by eliminating guesswork."
—*W. SCHROP, Ohio.*

MAIL COUPON NOW FOR 7-DAY FREE TRIAL

MOTOR Book Dept., Desk 2 H,
250 West 55th Street, New York 19, N. Y.

Rush to me at once: (Check box opposite book you want)

☐ **MOTOR'S New AUTO REPAIR MANUAL.** If O.K. I will remit $1 in 7 days, plus 35c delivery charge—then $2 monthly for 2 months, and a final payment of 95c a month later. Otherwise I will return book post-paid in 7 days. (Foreign price, remit $8 cash with order.)

☐ **MOTOR'S New TRUCK & TRACTOR REPAIR MANUAL.** (Described at left.) If O.K. I will remit $2 in 7 days, and $2 monthly for 3 months, plus 35c delivery charge with final payment. Otherwise I will return book promptly. (Foreign price, remit $10 cash with order.)

Print Name..... Age.....

Print Address.....

City & Zone No.....State.....

☐ **SAVE 35c** delivery charges by enclosing WITH COUPON check or money order for full payment of $5.95 for Auto Manual (or $8.00 for Truck Manual). Same 7-day return-refund privilege applies.

YOU can acquire

LAW NIGHTS AT HOME! L L.B. DEGREE

LaSalle's famous Law Library—used as reference in many Law libraries and Law offices—has enabled thousands to master Law surprisingly fast, in spare hours at home, for business and professional advancement.

These 14 remarkable volumes, compiled by leading professors and lawyers, cover the whole basic field of Law in condensed, orderly, simplified manner.

You advance rapidly with this great library, plus special lectures furnished. We guide you step-by-step with personalized Problem Method of instruction . . . you *learn by doing*—handling legal problems—not by memorizing rules.

Send for two FREE 48-page booklets, "Law Training for Leadership," and "Evidence," answering questions about Law and its value to you, and telling how LaSalle Law graduates are winning rapid advancement in business and public life. Mail coupon below. No obligation.

LA SALLE EXTENSION UNIVERSITY
A Correspondence Institution
417 S. Dearborn St. Dept. 783L Chicago 5, ILL.

Send me your two FREE booklets described above, without obligation.

Name.....*Age*.....
Street.....
City, Zone & State.....

INVENTORS

Your first step—if you consider your invention to be something of importance—is to have a search made of pertinent, prior U. S. patents. If our search report indicates probable patentability of your invention, you may apply for a patent which gives you the right to exclude others from making, using or selling your invention as claimed for a term of 17 years.

This firm is registered to practice before the U. S. Patent Office and is available to assist in the preparation of the necessary drawings, specification and claims.

Ask for a copy of our instructive booklet "Patent Protection for Inventors" and our convenient "Evidence of Invention" form. No obligation.

VICTOR J. **EVANS & Co.** *Merlin M. Evans*
REGISTERED PATENT ATTORNEY
740-H MERLIN BUILDING, WASHINGTON 6, D. C.

INVENTORS

Before you make any effort to market your invention, you should take the first steps toward proceeding for patent protection.

I shall be pleased to furnish you with information relative to patent procedure upon request from you, and this will be without any obligation on your part.

PATRICK D. BEAVERS
Registered Patent Attorney
937 Columbian Building, Washington 1, D. C.

INVENTORS

IF YOU WISH TO PROTECT YOUR INVENTION, You should take steps to protect it by a U. S. Patent. Write me for "INVENTION RECORD" FORM

CARL MILLER
REGISTERED PATENT ATTORNEY
WOOLWORTH BLDG., 35th FLOOR, 72C
NEW YORK CITY

INVENTORS

Whether an invention is patentable can be substantially determined by a search of the U. S. Patent records. Without obligation, write for information explaining the steps you should take to secure a patent.

JOHN N. RANDOLPH
Registered Patent Attorney
205 Columbian Building Washington 1, D. C.

PATENTS

C. A. SNOW & CO.
REGISTERED PATENT ATTORNEYS
WRITE FOR INFORMATION TO
426 SNOW BUILDING, WASHINGTON 1, D. C.

INVENTORS

Send for
PATENT INFORMATION
Book and
INVENTOR'S RECORD
without obligation

GUSTAVE MILLER
72PS Warner Building
Washington 4, D. C.

REGISTERED PATENT ATTORNEY
PATENT ATTORNEY & ADVISOR
U. S. NAVY DEPT. 1930-1947
ASSOCIATE EXAMINER
U. S. PAT. OFF. 1922-1929
PATENT LAWYER

FREE SAMPLE LESSON

WATCHMAKING

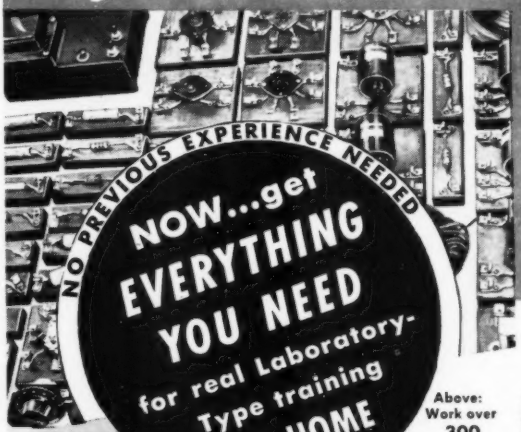
CHICAGO SCHOOL OF WATCHMAKING
1608 Milwaukee, Dept. 472, Chicago 47, Illinois

Show me without obligation how I can learn watch repairing at home. Rush free sample.

Name.....
Address.....
City.....Zone....State.....

Now IN YOUR OWN HOME *Learn* TELEVISION RADIO

the Amazingly Effective D.T.I. WAY



Above: Work over 300 fascinating experiments with this equipment

—with the aid of BOTH HOME EQUIPMENT and HOME MOVIES

What will mailing the coupon below *do for YOU?* Just this! You'll find out about one of today's most remarkable . . . practical ways to prepare to get into America's amazing billion dollar opportunity field of TELEVISION-RADIO-ELECTRONICS. You'll see how to get into fascinating work that pays well...that offers one of America's most promising futures... that enables you to start your own business almost "on a shoe string," if you prefer this to a job opportunity.

And above all, you'll get some GOOD NEWS especially welcomed by men anxious to earn REAL MONEY in this thrilling field. For you'll see that NOW you can get the kind of practical, laboratory-type training so desirable for making real progress in Television-Radio-Electronics . . . and *WITHOUT* LEAVING HOME.

You'll see that DeForest's Training, Inc. sends everything needed to set up your own HOME LABORATORY. You get and keep the same type of basic electronic equipment used in our modern Chicago Training Laboratories. You get home training that includes the knowledge and experience gained from training thousands of students first hand in Chicago. And to top it all, you use DTI's amazingly effective and exclusive home training aid—INSTRUCTIVE MOVIES. But why not get the complete story? Mail coupon today for information-packed literature.

1. Build over 300 fascinating experiments from 16 BIG SHIPMENTS of Electronic-Radio parts which you KEEP.

2. Build valuable commercial-type test equipment—as shown to the left—which you KEEP. This includes a quality OSCILLOSCOPE—a must for Television work.

3. Use a 16 mm. movie projector and new series of Hollywood produced instructive movies—a wonderful aid to help you grasp important fundamentals faster...easier...better.

4. Enjoy well-illustrated, easy-to-read lessons with handy FOLD-OUT diagrams.

5. Get an honest-to-goodness EMPLOYMENT SERVICE to help you get a good job after graduating—or assistance in starting your OWN SALES AND SERVICE BUSINESS. Mail coupon today for the complete details.

MODERN LABORATORIES

If you prefer, get all your preparation in our new Chicago Training Laboratories—one of the finest of its kind. Ample instructors, modern equipment. Write for details!

MILITARY SERVICE!

If you're subject to military service, the information we have for you should prove very helpful. Mail coupon today.

Get BOTH of these colorful, information- packed folders FREE

Mail Coupon Today

DeFOREST'S TRAINING, INC. Dept. PS-7-1
2533 N. Ashland Avenue, Chicago 14, Ill.

I would like valuable, information-packed folders showing how I may get started toward a good job or my own business in Television-Radio-Electronics.

Name _____ Age _____
Street _____ Apt. _____
City _____ Zone ____ State _____

DeFOREST'S TRAINING, INC.
AFFILIATED WITH
De Vry Technical Institute
CHICAGO 14, ILLINOIS

EVEN IF YOU DON'T KNOW A NOTE OF MUSIC NOW...

YOU CAN LEARN YOUR FAVORITE INSTRUMENT THIS EASY A-B-C WAY

NO special talent, no previous training needed. This U. S. School home-study method is so successful because you learn to play by playing real tunes by note, right from the start. And just think, you can learn your favorite instrument for only a few cents a day! If interested, mail coupon for FREE Booklet and Print and Picture Sample. See for yourself how easy it is to learn any instrument, right at home, in spare time, without a private teacher. **U. S. SCHOOL OF MUSIC, Studio B157, Port Washington, N. Y.**

(54th Successful Year.)

Send For FREE BOOK

FREE! *Print and Picture Sample*

U. S. SCHOOL OF MUSIC,
Studio B157, Port Washington, N. Y.
Please send me Free Booklet and Print and Picture Sample. I would like to play (Name Instrument).

Instrument..... Have you Instrument?.....

Name.....
(Please Print)

Address.....

SEND NO MONEY • MORE THAN 4000 PAGES • 2750 PICTURES

9 BIG COMPLETE BOOKS
BUILDING, ESTIMATING, CONTRACTING

Examine this Up-to-Date Edition for 10 days. See how these nine books supply easily understood training that will help you to get a *better job* and make *more money*, or start a profitable business for yourself. Think what a BIG help it will be to have them handy for use in solving all sorts of building problems.

Learn to draw plans, estimate, do all-new construction and modern remodeling to meet fast growing demand. More than 4000 pages of practical, pay-raising information with 2750 helpful illustrations, on such subjects as blueprint reading, concrete forms, masonry, carpentry, steel square, electrical wiring, plumbing, heating, painting, and *hundreds more*.

In our more than 50 years we have never offered more complete building information. Send the coupon TODAY.

(A year's consulting privileges with our engineers now given with these books without extra cost.)

AMERICAN TECHNICAL SOCIETY—Publishers Since 1898
Dept. GB20, Drexel Ave. at 58th St., Chicago 37, Ill.

I would like to examine your 9-Volume Set of Building, Estimating, Contracting Books. I will pay the delivery charges only, but if I choose I may return them express collect. If after 10 days' use I prefer to keep them, I will send you $3 and pay the balance at the rate of only $4 a month until $34.80 has been paid. Include consulting service as offered above.

Name_____

Address_____

City_____ State_____

Please attach letter giving employer's name and address (if self-employed give business man reference). Men in service please give home address.

"How to Become a Mail Order Millionaire"

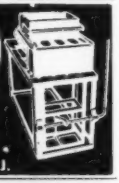
SENT FREE!
RUSH NAME ON POSTCARD TODAY

Read the inside facts about hundreds of "little fellows" who are running Mail Order businesses from their homes—many making $20,000 and more **every year!** Learn how small investments ($16.80 in one case!) have mushroomed into profits of thousands. This incredible reprint from *Mechanix Illustrated* will be sent absolutely **free,** along with details showing how you can quickly master the secrets of getting orders and money in your daily mail, *in a business that's all yours.* Rush name today. A postcard will do.

The L. W. SURVEY 7070 North Clark Street, Dept. 37, Chicago 26, Ill.

MANUFACTURE BUILDING BLOCKS Easy to start your own profitable business. General high speed, low cost Concrete Vibrator Block Machine produces 1000 blocks in 8-hour day. All sizes and shapes. Complete details FREE. Mail $1 for wonderful book, "How to Build Your Own Concrete Block Home."

Only $218



GENERAL ENGINES CO.
307 HUNTER ST., S-72 GLOUCESTER, N. J.

WRITE 3 WORDS
MAKE $6.00 PROFIT—

—on 10-Second Demonstration to merchants. Write on glass with amazing Magic Crayon—Presto!—5 color advertising message takes fire, glows like brilliant Neon. Three sales daily bring **$18** profit. Rush name for FREE Sales Kit!

Write with Light—

MAXILUME CO., 125 W. Hubbard, Dept. L-9-M, Chicago 10, Ill.

WALKIE TALKIES $4.99 Set of 2

POCKET SIZE —ELECTRONIC VOICE POWERED

No tubes, batteries, adjustments, license or permit needed! Guaranteed to work anywhere up to 1/4 mile with extra wire. **Swell for room to room—garage to house, etc! Your own private, talk-listen phone. Not war surplus. Brand new. Guaranteed. Two complete units with wire —READY TO USE!**

SEND $1.00 deposit and pay postman $3.99 plus postage charges or send $4.99 for postpaid delivery. Sold **only** by mail from:

MIDWAY COMPANY, Dept. WPS-7, Kearney, Nebraska

Free Book on Arthritis And Rheumatism

HOW TO AVOID CRIPPLING DEFORMITIES

Explains why drugs and medicines give only temporary relief and fail to remove the causes; tells all about a specialized non-surgical, non-medical treatment which has proven successful for the past 33 years. Write for this 44-page FREE BOOK today.

Ball Clinic Dept. 36 Excelsior Springs, Mo.

MONEY for MEN ALL DATA FREE

THE PLASTEX Industry needs manufacturers on small scale and for big production of Lamp and Clock Stands, Art Goods and Novelties in Plastex and Marble imitation. Experience unnecessary. 1½c material makes regular 10c store sellers. Rubber moulds furnished for speed production. Small investment brings good returns. We are now placing big chain store orders with manufacturers. Ambitious men have chance for real prosperity. Our Free booklet will interest and benefit you.

PLASTEX INDUSTRIES, Dept. Z, 3480 Third Ave., New York 56, N. Y.

TRAIN AT HOME IN YOUR SPARE TIME

GET THE MONEY AND SECURITY YOU'VE ALWAYS WANTED!

L. J. ROSENKRANZ, President, National Schools, the man who has trained many, many men like YOU. Men who now own successful, respected businesses of their own. Men who hold important, high-paying positions in famous companies. You CAN be a success. Mail coupon for more details.

Let Me Show You How! Mail the Coupon for My FREE Books!

Each book has page after page in color. Gives you the complete story about my proved training method... tells how quickly it can train you for a secure, high-paying job. Don't wait. Get the facts. Send today for my valuable books on Radio-Television or Automotive-Diesel. Check the coupon at right and mail it to me today. Absolutely no obligation.

NO SALESMAN WILL CALL!

I'll send you a **FREE SAMPLE LESSON TOO,** if you act fast! Shows how easy it is to learn with National Schools Home Training.

DON'T PUT IT OFF...MAIL TODAY!

NATIONAL SCHOOLS, Dept. C-72
4000 South Figueroa Street
Los Angeles 37, California

Mail in envelope or paste on penny postal card

Send me *Free* the book checked below and the sample lesson. I understand no salesman will call on me.

☐ **"MY FUTURE IN RADIO-TELEVISION & ELECTRONICS" OR**
☐ **"MY FUTURE IN DIESEL-AUTOMOTIVE & ALLIED MECHANICS."**

NAME _____ AGE _____
ADDRESS _____
CITY _____ ZONE _____ STATE _____

☐ Check here if you were released from the service less than 4 years ago.

Let National Schools – a resident-training school for nearly 50 years–train you at home for today's unlimited opportunities in Radio-TV or Automotive-Diesel. National Schools is one of the largest schools of its kind in the world. It has 4 big buildings of modern shops and labs. Its faculty is considered tops. You learn fast from easy lessons –all perfected under actual shop conditions. Approved for eligible vets.

Earn Extra Money while you're learning! I'll show you how!
EASY TERMS • FREE GRADUATE SERVICE
Mail coupon today—find out more!

WHICH HIGH-PAYING FIELD DO YOU WANT?

TODAY'S SHORTAGE OF TRAINED TECHNICIANS CREATES CHANCE OF A LIFETIME FOR YOU...IN EITHER FIELD!

RADIO-TELEVISION & ELECTRONICS

JOB SECURITY! BIG MONEY! FOR YOU IN TODAY'S EXPANDING INDUSTRIES!

Think of it! With guided missiles, radar and other electronic devices so important to national defense. With big, new developments in color TV. With over 90,000,000 home and auto radios, over 12,000,000 TV sets. With more than 3100 radio stations...over 100 TV stations–and more building every day–imagine the terrific opportunity you have!

You Train at Home—In Your Spare Time

With National Schools Master Shop Home Training, you master *all* phases of Radio-Television-Electronics. You learn fast from hundreds of pictures and diagrams. All lessons have been developed and tested in National Schools famous shops and labs. No wonder your National Schools training is so up-to-date, practical, interesting. And so easy!

LOOK! WE SEND YOU ALL THESE PARTS! —and you keep them!

We send you lots of standard professional parts. You do lots of practical experiments. You learn step by step. Until you can build the big Superheterodyne Receiver you see above–and other important test units. Mail the coupon–today.

I TRAIN YOU FOR GOOD-PAYING JOBS LIKE THESE

Radio Station Engineer; District Service Manager; Aircraft Radio Inspector; Inspector Technician; Own your own repair shop; Service Specialist; Special Civil Service Positions; Sound Truck Operator; Complete Television Service and many others.

Thousands of National Schools graduates have jobs like these. Why not you? Start your career - be sure to mail the coupon today.

Only National Schools Gives You This Professional Multi-Tester

You get this factory-made new Multi-Tester ... an important instrument every Radio-TV man must have.

OR

AUTOMOTIVE-DIESEL AND ALLIED MECHANICS

GREATEST DEMAND FOR TRAINED MEN IN HISTORY! NOW IS YOUR CHANCE!

What an opportunity! With over 8 million older cars needing big service and repair jobs. With defense industry having more high-paying jobs than they can fill. With the Armed Forces offering quick advancement to trained mechanics. YOU ARE NEEDED as never before! Now you can get the good pay, security, the satisfaction of doing what you *want* to do! Don't delay–mail the coupon NOW!

Right in Your Own Home!

You learn all about Gasoline Engines, Diesel and Special-Fuel Engines, Automotive Tune Up, General Garage Mechanics, Auto Electrical Service. You get complete training for this great, growing industry.

Yet National Schools Home Training is easy! Because it's based on actual shop methods in National Schools big resident school. Mail the coupon for more details–NOW.

National Schools Gives You All These Tools

You start out owning the tools of your trade. A kit of standard, professional tools and equipment. They're all part of your course!
–And you keep them–they're yours!

I Offer You All These!

Basic Lesson Texts. Diesel Installation & Maintenance Instructions. Spare Time Lessons. Engine Service Manuals. Engine Repair Drive Systems. Diesel Electric Power Texts. Special Thermodynamic Instruction.

WHICH OF THESE HIGH-PAYING JOBS WOULD YOU LIKE?

MOTOR TUNE UP SPECIALIST
DIESEL ENGINE SPECIALIST
FARM EQUIPMENT MECHANIC
YOUR OWN GARAGE OR REPAIR SHOP
GENERAL GARAGE MECHANIC
PARTS DEALER
AUTO ENGINE REBUILDING
FUEL INJECTION SPECIALIST

You can *have* secure jobs like these. Just mail the coupon–and find out!

Attention: Men Going into the Service Soon!

With National Schools training in Radio-Television or Automotive-Diesel, you have the opportunity to get into special service classifications. That means higher pay and grade, more prestige–right away! This is important–so be sure to mail the coupon today without fail.

NATIONAL SCHOOLS TECHNICAL TRADE TRAINING SINCE 1905 LOS ANGELES 37, CALIFORNIA

Northrop Students BUILD MINIATURE —PULSE JETS—

Train Now at NORTHROP for an Exciting AVIATION CAREER

Men training *today* at Northrop Aeronautical Institute as Aeronautical Engineers or Aircraft & Engine Mechanics, will design, build, and maintain the jet and rocket aircraft of tomorrow! You can begin *NOW* to prepare yourself for this *exciting, profitable future!*

Train at NORTHROP! At Northrop Aeronautical Institute, *a division of the famed Northrop Aircraft Inc.*, you study in an atmosphere of aeronautical achievement! You put your mechanical skills to work helping design, layout, draw, mock-up, fabricate, test and assemble *experimental aircraft!*

Extra Advantages for You! It's the *trained* man who gets the best jobs—advances the fastest in important work, either civilian or military. For example, Northrop Engineering graduates are educationally qualified for Naval Aviation Cadet, Air Force Cadet, or Officer Candidate training.

FREE Northrop Catalog. Send today for the big 34-page Northrop catalog that describes the career opportunities in aviation, outlines the courses offered, and shows pictures of the training facilities you will use.

APPROVED FOR VETERANS

Northrop *Aeronautical Institute*

1525 E. Broadway, Hawthorne, Los Angeles County, Calif.

NORTHROP AERONAUTICAL INSTITUTE
1525 E. Broadway, Hawthorne, Los Angeles County, Calif.

Please send me immediately the Northrop catalog, special military information and employment data, and schedule of starting dates of classes. I am interested in:
☐ Aeronautical Engineering ★ Aircraft & Engine Mechanics ☐

Name_____ Age_____
Address_____
City_____ Zone____ State_____
☐ VETERANS—Check here if you are entitled to training benefits under the G. I. Bill.

Get into Good Paying AUTO BODY *and* FENDER WORK

BIG DEMAND in Auto Body and Fender work. Start training now in your spare time at home for good pay work. Practical shop experience included. U.E.I. Training covers metal work, welding, painting, etc. Placement service—or we will show you how to start your own shop. Behind U.E.I. TRAINING is a large national organization founded 1927. Write today for FREE FACTS—No obligation.

Write For Free Facts

AUTO-CRAFTS DIVISION • **UTILITIES ENGINEERING INSTITUTE**
2523 SHEFFIELD AVE., DEPT. XM-15, CHICAGO 14, ILLINOIS

FREE BOOKLET TELLS YOU HOW

ART

Offers You a Profitable Career
—a wonderful hobby!

New Trial Plan proves that you can learn how to draw at home the WSA way, famous since 1914. Commercial Art, Illustrating, Designing, Cartooning all in one course. Write for free book; read the success stories of our graduates. See how we prepare you in this well paid field.

MAIL COUPON FOR FREE BOOK

WASHINGTON SCHOOL OF ART
Studio 137F, Washington 5, D. C. PLEASE PRINT
Send Free Book, "Art for Pleasure & Profit." No Salesmen will call.

Name_____ Age_____
Street_____
City_____ Zone____ State_____
☐ I am interested in your new Trial Plan

SENSATIONAL
OPTICAL BARGAINS

USEFUL 80 POWER IMPORTED BABY MICROSCOPE

A little gem, gives astounding sharp definition! Good optical qualities, hinged base for inclined, easy viewing, easy-to-use pinion focusing. Circular stage, revolving disc-light mirror. A real buy! 10 day refund priv. if you are not completely satisfied. Only 5" High! Just $4.00 Postpaid

Stock #50,000-N ..... **$4.00 Postpaid**

SLIDE PROJECTOR SETS Consists of all unmounted lenses you need to make the following size projectors:
Stock #4029-N—35 mm. ..... **$2.85 Postpaid**
Stock #4038-N—2¼"x2¼" ..... **$3.35 Postpaid**
Stock #4039-N—2½"x3½" ..... **$3.35 Postpaid**

SIMPLE LENS KITS —Include plainly written, illustrated booklet showing how you can build lots of optical items. Use these lenses in photography and for dozens of other uses in experimental optics, building TELESCOPES, low power Microscopes, etc.
Stock #2-N—10 lenses ..... **$ 1.00 postpaid**
Stock #5-N—45 lenses ..... **5.00 postpaid**
Stock #10-N—80 lenses ..... **10.00 postpaid**

We Have Literally Millions of War Surplus Lenses and Prisms for Sale at Bargain Prices. Numerous Types of Instruments, Too! Write for FREE CATALOG-N

EDMUND SCIENTIFIC CORP., Barrington, N. J.

BECOME AN EXPERT IN TRAFFIC

Traffic men earn $4,000 to $10,000 and up. Thousands of firms need experts on rates, tariffs, regulations. We train you thoroly in spare time at home for executive traffic jobs. Personal training under traffic authorities. Placement counsel and help. Write for free 48-page book "Traffic Management—the Fast Growing Profession."

LASALLE Extension University, 417 So. Dearborn St.
A Correspondence Institution, Dept. 783T, Chicago 5, Ill.

HYPNOTISM

Learn to apply this tremendous POWER. Develop will-power, self-confidence, self-control. ANYONE can master this exciting, profitable profession in short time by training at home, with GUARANTEED RESULTS. DON'T DELAY . . . . Write to America's oldest Hypnotic school for free information now—today!

INSTITUTE OF APPLIED HYPNOLOGY
120 Central Park So., N. Y. 19, Dept. 78

FIX LOCKS

Learn Locksmithing and Keymaking from Experts in Your Spare Time at Home!
Age or physical handicap no disadvantage. Year-round, steady income in this permanent, respected field. Full or part time. Practical, illustrated lessons show you how to make money even while learning! All materials and special tools supplied. Send for FREE BOOKLET.

LOCKSMITHING INSTITUTE, Dept. PS-31
15 Park Ave. Rutherford, N. J.
Lic. by State of N. J. V.A. Approved

ILLUSTRATED CARTOON BOOKLETS!
SAY FELLOWS! BE THE LIFE OF THE PARTY WITH THESE SMALL ILLUSTRATED CARTOON BOOKLETS OF COMIC CHARACTERS!
10, ALL DIFFERENT, $1 POSTPAID
SORRY... NO POSTAL C.O.D.'S!
REGINALD SALES
210 L Fifth Ave., New York, N. Y.

SHORTHAND in 6 Weeks at Home

Famous Speedwriting Shorthand. 120 wpm. No symbols; no machines; use ABC's. Easiest to learn; write and transcribe. Low cost. 100,000 taught by mail. For business and Civil Service. Also typing. 29th year. Write for FREE booklet to:

Speedwriting®
Dept. 2607-2, 55 W. 42 St., New York 18

FULLY GUARANTEED TIRES COST LESS!

Nationally famous **FIRESTONE, GOODRICH, U.S. ROYAL, GOODYEAR,** and other makes. Every tire selected and inspected for your safety.

NEW TREAD TIRES GUAR. 24 MOS. (WHITE WALLS $2.00 EXTRA)

550x16	8.98	600x16(6)	10.98	650x20(8)	20.95	700x16(6)	15.48		
550x17	8.98	650x15	10.98	640x15	9.98	710x15	11.48		
600x15	8.98	650x16	11.48	670x15	10.98	760x15	12.48		
600x16	8.98	650x16(6)	13.48	700x15	12.48	820x15	13.98		

GOOD TIRES GUARANTEED 12 MONTHS

600x16	4.14	700x16	5.14	32x6(8)	8.84	825x20	14.24		
650x16	4.54	670x15	4.74	32x6(10)	10.84	900x20	13.34		
650x15	4.34	650x20	7.84	750x20(8)	8.54	1000x20	14.14		
700x15	4.64	700x20(8)	8.94	750x20(10)	9.94	1100x20	16.14		

AAA PREMIUM GRADE GUARANTEED 18 MONTHS

550x15	5.48	700x15	5.98	760x15	5.58	750x20(10)	14.98
600x16	5.28	700x16	6.78	550x17	5.48	825x20	18.68
600x16(6)	6.58	700x16(6)	7.98	600x20	9.78	900x20	18.98
640x15	5.68	750x16(6)	8.98	650x20	10.88	1000x20	19.98
650x16	5.78	800x15	6.88	700x20	12.88	1000x22	21.98
650x16(6)	6.98	820x15	7.48	32x6(8)	10.48	1100x20	20.98
650x15	5.98	710x15	6.09	32x6(10)	12.48	1100x22	21.98
670x16	6.18	550x18	5.98	750x20(8)	12.98	1100x24	23.98

MILITARY SPECIAL

AA Guaranteed 12 Months—
900x16 10.69 | 900x20 19.98
750x20 10.98 | 1100x20 21.98

AAA GUARANTEED 18 MONTHS
900x16 14.98 • 750x20 16.48

New Tread Guar. 24 Mos.
600x16 9.98
600x16 (6) 10.98
700x15 (6) 16.95
750x20 (8) 25.98

Passenger Tubes—Water Tested—All Sizes..$ .95
Truck Tubes—Water Tested—All Sizes.....$2.45

Largest stock of used tires in the East. Thousands of satisfied customers. Write for sizes not listed.
MONEY ORDER OR CHECK WITH ORDER. NO C.O.D.'s

PYRAMID TIRE CO.
1333-35 North 5th St.
Dept. S., Phila. 22, Pa.

LARGEST STOCK · PENNA'S LARGEST USED TIRE DEALERS

STEADY PROFITS!

Your Own Business With

CORADIO

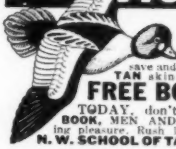
Coin Operated Radio

Place these specially built radios that play 1 or 2 hours for 25c in the thousands of available hotel rooms, tourist courts, etc. They yield immediate profits and steady income. Minimum capital required $750 for equipment. Expansion unlimited. For further information write:

CORADIO *Coin Operated Radio*

DEPT No. 7PS | Phone: BEekman 3-0038-9 | 212 BROADWAY NEW YORK 38, N. Y.

LEARN TO MOUNT BIRDS



ANIMALS, FISH, PETS

Be a Taxidermist. Save your hunting TROPHIES. Have a fine home-museum. Hunters, save and **MOUNT** your beautiful DUCKS, QUAIL, DEER, **TAN** skins, FURS, **Great Fun.** Spare-time **PROFITS.**

FREE BOOK Tells ALL about it. 100 fine wild-game pictures, 48 pages. SEND TODAY, don't delay. Get this WONDERFUL **FREE BOOK,** MEN AND BOYS. Learn Taxidermy. Double your hunting pleasure. Rush letter or **POSTAL** today. **STATE YOUR AGE.**

N. W. SCHOOL OF TAXIDERMY, Dept. 2607 Omaha, Neb.

High School at Home

Many Finish in 2 Years

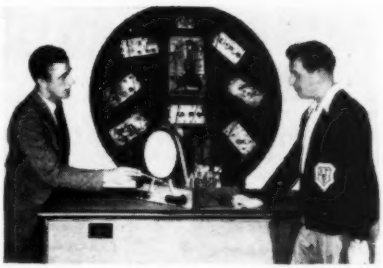
No classes. No time wasted going to and from school. Progress as fast as your time and abilities permit. Standard H. S. texts supplied. Thousands enroll each year in this 55-year-old school. Send for FREE descriptive booklet.

AMERICAN SCHOOL, Dept. H846
Drexel at 58th St., Chicago 37, Ill.
Without obligation, please send FREE descriptive booklet.

Name.....

Address.....

BECOME AN Electrical Engineer



- **Major in Electronics or Power B. S. Degree in 36 months**
- **Television Technician Certificate in 18 months**

FOLLOW THIS PLAN
By 1954 there will be *at least* two positions for every engineering and technician graduate. Enter these opportunities early . . . earn your B. S. Degree in 36 months through optional year 'round study.

TELEVISION
TECHNICIANS are needed throughout America's fastest growing industry.
You become a Radio Technician in 12 months. In 6 additional months become a *Radio-Television Technician.* These Technician Courses are complete in themsevles and can be applied as *one-third* of the B. S. Degree program. Recent developments forecast unlimited opportunities for TV technicians and engineers.

Choose from these courses:
General preparatory course—3 months

SERVICE 6 months
- Electricity
- Welding
- Refrigeration
- Heating

TECHNICIAN 12 to 18 months
- Radio and Television
- Electronics
- Electrotechnics (Power)
- Mechanical Technician
- Welding
- Air Conditioning

ENGINEERING 36 months B.S. Degree
- Electrical Engineering Major in Electronics or Power
- Mechanical Engineering

TERMS OPEN OCTOBER, JANUARY, APRIL, JULY
Military, Practical or Academic training evaluated for advanced credit. Faculty of specialists. Over 48,000 former students from all states and 23 overseas countries. *Nonprofit. Founded in 1903.*

MILWAUKEE SCHOOL OF ENGINEERING

MILWAUKEE SCHOOL OF ENGINEERING
Dept. PS-752, 1025 N. Milwaukee
Milwaukee 1, Wisconsin

Without obligation send Catalog for Electrical Engineering, B. S. Degree, major in ☐ Electronics; ☐ Power; ☐ "Your Career"; Occupational Guidance Bulletin on: ☐ Radio-TV ☐ Electrical Power ☐ Mechanical Engineering ☐ Welding ☐ Heating, Refrigeration, Air Conditioning ☐ Preparatory.

Name.....Age.....

Address.....

City.....Zone.....State.....

If veteran, indicate date of discharge.....

WORK IN COOL SAN DIEGO

Illustrated book sent FREE

San Diego offers you California living at its best — and Convair gives you the top working conditions. Employee Retirement Plan. Group Insurance. Two weeks vacation. Eight holidays annually. Free Housing Office and much more — *plus* that wonderful San Diego climate. These classifications now open for you:

1. TOOL DESIGNERS
2. TOOL PLANNERS
3. PATTERN MAKERS
4. TOOL & DIE MAKERS
5. JIG AND FIXTURE BUILDERS
6. MACHINISTS
7. LOFTSMEN
8. FIELD & SERVICE MECHANICS
9. AIRCRAFT MECHANICS
10. AIRCRAFT ELECTRICIANS
11. IBM TAB MACHINE OPERATORS
12. INSPECTORS

CONVAIR

Send this coupon for FREE book and details:

Employment Office 600
Consolidated Vultee Aircraft Corporation
3302 Pacific Hiway
San Diego, California

NAME _____

OCCUPATION _____

ADDRESS _____

CITY _____ STATE _____

DYNAMIC POWER TOOL COMBINATION

INCLUDES: Cummins ¼" Electric Drill; Cummins Saw Attachment; Combination Saw Blade; Set of Drills; Lambs Wool Bonnet; 6 Sanding Disks; Steel Arbor and Attachments; Cloth Buffing Wheels; Grinding Wheel; Wire Wheel Brush; Steel Paint Mixer; Steel Bench Stand; Portable Steel Carrying Case.

Price of Dynamic Power Tool Combination complete is $26.95

SHIPPED ON APPROVAL

NO MONEY WITH ORDER – NO C.O.D.

Try it ten days before you buy. If completely satisfied then send $2.95 and pay balance at rate of $4.00 per month for 6 months—No Interest or Carrying Charges Added. If not completely satisfied, return to us, no explanation necessary.

KAPNER HARDWARE INC.
Dept. A-38, 2248 Second Ave., New York 29, N. Y.

Please rush 1 Dynamic Power Tool Combination. I agree to pay $2.95 within 10 days after receipt and $4 a month thereafter.

Name.....
Address.....
City.....Zone.....State.....
Employed by.....

Start Your OWN ELECTRICAL APPLIANCE REPAIR BUSINESS

Repair electrical appliances of friends and neighbors. Service electrical equipment in factories, stores, etc. Work full or part time! New Shop Method home-training system. Rush name today for **FREE BOOK** and special form for getting Electronic Kit. Valuable Heating Element Kits. Advisory Service and illustrated instructions on new easy-payment plan. Pay later from **EARNINGS WHILE LEARNING.** Rush name today.

CHRISTY TRADES SCHOOL
4432 N. Kedzie Dept. D-1701 Chicago 25

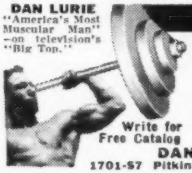
Success-Winning VOICE!

Sound Like the He-MAN you are

STRENGTHEN your voice this tested scientific way. Yes—you may now be able to improve the POWER of your speaking and singing voice . . . in the privacy of your own room! Self-training lessons, mostly silent. No music required.

FREE BOOK Write TODAY for Eugene Feuchtinger's great booklet "How to Develop a Successful Voice." It's absolutely FREE! You must state your age. Booklet mailed postpaid in plain wrapper. No salesman will call. Send your name and age RIGHT NOW!
Prefect Voice Institute, 210 S. Clinton St., Studio GY-1, Chicago 6, Ill.

DAN LURIE
"America's Most Muscular Man" —on television's "Big Top."



Write for Free Catalog

FAMOUS DAN LURIE

BARBELLS

with 4 courses—low factory prices

50 lb. set....$ 8.48	150 lb. set....$20.48
100 lb. set.... 13.98	200 lb. set.... 25.98

Order by Mail; 50% with order, bal. C.O.D. Extra wts. 10c per lb., F.O.B. plant

DAN LURIE BARBELL CO.
1701-57 Pitkin Ave., Dept. 270-G, Brooklyn, N. Y.

GET THIS SUIT AS A BONUS!

Sell popular Smith tailored-to-measure suits. Make up to $10.00-$15.00 daily taking orders from friends. You get paid 3 times—(1) when you take the order and pocket the cash profit,—(2) when we pay you an EXTRA cash bonus,—(3) when you get your own suit as an added bonus, without cost. No experience needed. Send for FREE selling kit and sample line. Write fully, give age, sales exp., etc.

W. D. SMITH & CO., Dept. E
833 W. Jackson Blvd., Chicago 7, Ill.

TREASURE HUNTERS

Revolutionary new type metal detector. Distinguishes metals from black magnetic sands. Detects metals under salt water. Many oustanding features. Free literature. **Gardiner Electronics Company, Dept. 22-A, 2018 N. Dayton, Phoenix, Arizona.**

FREE FOR ASTHMA

If you suffer with attacks of Asthma and choke and gasp for breath, if restful sleep is difficult because of the struggle to breathe, don't fail to send at once to the Frontier Asthma Company for a FREE trial of the FRONTIER ASTHMA MEDICINE, a preparation for temporary symptomatic relief of paroxysms of Bronchial Asthma. No matter where you live or whether you have faith in any medicine under the sun, send today for this free trial. It will cost you nothing.

FRONTIER ASTHMA CO. 123-T FRONTIER BLDG.
462 NIAGARA ST. BUFFALO 1, N. Y.

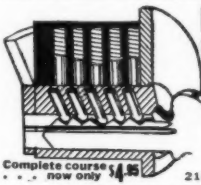
C2 **COLORCRETE**

Lifetime beauty comes out of a gun! Colorcrete is a cementitious plastic, applied by pneumatic pressure to new or old concrete, stucco, etc. Tough, tenacious, enduring. Can be washed or scrubbed. Dirty, drab surfaces become sparkling white or tinted from a range of 30 colors.

"Building-Beautifying" – Your Big Opportunity

Colorcreting is a fascinating and profitable opportunity for men who want to build a substantial, long-term business. Colorcreting is exclusive. Rich in sales appeal to building owners. Income potentials are high; investment is low. We supply complete equipment, full instructions and liberal cooperation. Requires no previous experience or special ability. Write or wire for the Opportunity Book today. Be the first in your community.

COLORCRETE INDUSTRIES, INC.
572 Ottawa Ave., Holland, Mich.



Locksmithing AND KEY MAKING
Now Made Easy! Practical up-to-date course teaches you how to pick locks, de-code, make master keys, repair, install, service, etc. New self-instruction lessons for every handyman, homeowner, carpenter, mechanic, service station operator, fix-it shop, hardware dealer, gunsmith. 53 easy illustrated lessons. Full price only $4.95, postpaid; or C.O.D. plus postage. Satisfaction or refund guaranteed.

Complete course . . . now only $4.95

Nelson-Hall Co., Dept. GY-1
210 S. Clinton St., Chicago 6, Ill.

100 POWER... Telescope Lens Kit COMPLETE ONLY $3.00

NEW 3 IN 1 VALUE! Build a 45X and 100X Astronomical telescope! Converts to 45X Terrestrial telescope! Explore the wonders of the sky. View distant objects on earth. Kit consists of 47mm dia. 50½" focal length ground and polished objective lens, 100X eyepiece lens, 45X eyepiece lens, easy building instructions. Mounting and tripod not included, easily made. Money Back Guarantee.

LEMAR SCIENTIFIC CORP., Dept. E-77, 3412 W. Jackson Blvd., Chicago 24

make your own Gems 29.50 F.O.B.

All necessary lapidary equipment is furnished, including a super-charged diamond blade for sawing, and all wheels for grinding, shaping and polishing; also complete instructions. The complete equipment as shown, less motor and belt, for only $29.50, f.o.b., Burlington, Wisconsin. Write today for information and literature.

B&I MANUFACTURING CO.
Dept. M Burlington, Wis.

NO CAR TROUBLE IS HARD TO FIND...

when you have MOTOR'S new "Trouble Shooter"

Handy, pocket-size indexed manual lists 2000 CAUSES of car troubles and tells WHERE to look for them. For instance, suppose Fan Belt is noisy; index leads you *instantly* to 7 things that can be wrong. In same way, "Trouble Shooter" covers engines, clutches, brakes, ignition, rear axles, overdrives, etc. Section on automatic transmissions *alone* is worth more than price of book! Spiral binding; book stays open while you work.

$1

SEND NO MONEY. Try book at our risk. Just mail your name and address to: **MOTOR Book Dept., Box DY, 250 West 55th St., New York 19, N. Y.** Pay postman $1 plus C.O.D. chg. Use 7 days. If not delighted, your $1 back. (Or save C.O.D. cost by sending $1 now. Same money-back guarantee.)

Lend Me 15 Minutes A Day

..and I'll prove I can make you a NEW MAN

I'M trading in old bodies for new! I'm taking men who know that the condition of their arms, shoulders, chests and legs—their strength, "wind," and endurance—is not 100%. And I'm making NEW MEN of them!

If you can simply raise your arm and flex it, I can add SOLID MUSCLE to your biceps—yes, on each arm—in double-quick time! I can broaden your shoulders, strengthen your back, develop your whole muscular system INSIDE and OUTSIDE!

What Only 15 Minutes a Day Can Do

I can add inches to your chest, give you a vise-like grip, make those legs of yours lithe and powerful. I can shoot new strength into your old backbone, exercise those inner organs, help you erase your body so full of pep, vigor and red-blooded vitality that you won't feel there's even "standing room" left for weakness and that lazy feeling! Before I get through with you I'll have your whole frame "measured" to a nice, new, beautiful suit of muscle!

I Was a 97-lb Weakling

All the world knows I was ONCE a skinny, scrawny 97-pound weakling. And NOW it knows that I won the title, "The World's Most Perfectly Developed Man." Against all comers! How did I do it? How do I work miracles in the bodies of other men in only 15 minutes a day? The answer is *"Dynamic Tension,"* the amazing method I discovered and which changed me from a 97-pound weakling into the champion you see here!

FREE My 32-Page Illustrated Book Is Yours — Not for $1.00 or 10c — But FREE

Send NOW for my famous book, "Everlasting Health and Strength." 32 pages, packed from cover to cover with actual photographs and valuable advice. Shows what *"Dynamic Tension"* can do, answers vital questions. Page by page it shows what I can do for YOU. This book is a *real prize* for any fellow who wants a better build. Yet I'll send you a copy absolutely FREE. Just glancing through it may mean the turning point in your whole life! So don't put it off—send the coupon to me personally: **Charles Atlas, Dept. 1U, 115 East 23rd St., New York 10, N. Y.**

Charles Atlas

Actual photo of the man who holds the title, "The World's Most Perfectly Developed Man."

CHARLES ATLAS, Dept. 1U,
115 East 23rd St., New York 10, N. Y.

Send me—absolutely FREE—a copy of your famous book, "Everlasting Health and Strength"—32 pages, crammed with actual photographs, answers to vital health questions, and valuable advice to every man who wants a better build. I understand this book is mine to keep, and sending for it does not obligate me in any way.

Name ..... Age ....
(Please Print or Write Plainly)
Address .....
City ..... State .....

Learn this Profitable Profession

IN 90 DAYS AT HOME

Money-Making Career Open to Men and Women, 18 to 60

Hundreds of men and women between 18 and 60 make $10 to $20 in a single day giving scientific Swedish Massage and Hydro-Therapy treatments. There is big demand from doctors, hospitals, sanatoriums and clubs. Graduates earn large full time incomes from these or in private practice in their own offices. Others make good money from home treatments given in spare time. Learn this interesting, money-making profession in your own home, through our home study course. Same instructors as in our **nationally known** resident school. **You** can win independence and prepare for future security by qualifying for your Graduation Certificate. Course can be completed in 3 to 4 months. Many earn while they learn. Begin **your** training at once.

NEW 32-PAGE BOOKLET *FREE*

Fill in the coupon below (please print name and address) and mail it for your FREE copy of 32-page Information Booklet. If you act at once we will include Anatomy Charts and Success Booklet which supply additional information you should have. All will be sent postage paid.

THE COLLEGE OF SWEDISH MASSAGE
Dept. 270H, 41 E. Pearson St., Chicago 11, Illinois

Please send me FREE and postpaid New 32-Page Illustrated Booklet, Anatomy Charts and Success Booklet at once.

Name.....Age.....

Address.....

City.....State.....

READING-MAGNIFYING EYE GLASSES BY MAIL
30 Days Trial

Write Today for Free Catalog. Send no Money

ADVANCE SPECTACLE CO., Inc.
537 South Dearborn Street, Dept. SP-7, Chicago, Illinois

UNLIMITED OPPORTUNITIES IN ENGINEERING

DEGREE IN 27 MONTHS

Study Engineering in this world-famed school, established 1884. Demand for our graduates exceeds supply. Growing shortage of engineers. No field offers greater opportunities for responsible, lucrative positions.

Bachelor of Science Degree in Mechanical, Civil, Electrical, Chemical, Aeronautical, Radio (Television) Engineering; Business Administration and Accounting. Also 36-weeks certificate courses in Surveying and Drafting.

Personalized Instruction. Accelerated courses. Non-essentials eliminated. For ambitious, earnest students. Earn your degree in the shortest possible time. Preparatory courses. Placement service.

Extensive Campus. Well equipped, new and modernized buildings; up-to-date labs. Low cost. New terms start quarterly. Enter September, January, March, June.

Mail Coupon Today

TRI-STATE COLLEGE
572 College Avenue, Angola, Indiana

Please send me free catalog and special information. I am particularly interested in courses as checked:
☐ Mechanical ☐ Civil ☐ Electrical ☐ Chemical ☐ Aeronautical
☐ Radio (Television) ☐ Business Administration ☐ Accounting
☐ Short Diploma Courses

NAME.....

ADDRESS.....

WAR SURPLUS BARGAINS

$500,000.00 INVENTORY for QUICK LIQUIDATION

Surplus items—hundreds of them for home, shop, factory, farm and outdoor use. New items, used items, reconditioned items—all at tremendous savings—all priced for quick sale.

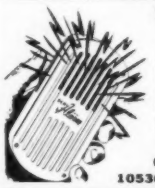
PAGE AFTER PAGE OF VALUES

This big catalog shows page after page of amazing money saving values. Write for your copy today. Send 10c to cover postage, mailing, etc. Write today!

10c

SEND TODAY FOR YOUR COPY

STARK'S 509 So. State St. Dept. PS-7 CHICAGO 5, ILL.



SIREN POCKET ALARM

May be used for a warning signal or protective device in emergency for the home, store or businesses. For decoying animals when hunting; for indoor or outdoor events. Remember you are well armed when you carry a Siren Alarm in your pocket or purse. A splendid gift to protect your loved ones. No batteries, just touch the button and on it goes. Built to last a lifetime. Original price, $12.50. Through mail, postpaid. Dealers and Jobbers inquire. **$4.95**

CROWN TRADING Room 3
10530 Long Beach Blvd., Lynwood, California

Bar Bells

BUY DIRECT FROM FACTORY
Write for free booklet and price list
$8.95 up

INDEPENDENT IRON WORKS
2416 East 23rd Street, Dept. "C"
Los Angeles 11, Calif.

"YOU ARE UNDER ARREST!"

Help Bring Crooks to Justice Through Scientific

CRIME DETECTION!

We have taught thousands this exciting, profitable, pleasant profession. Let us teach you **in your own home.** Learn Finger Printing, Firearms Identification, Police Photography, Secret Service Methods thoroughly, quickly, at small cost. Over 800 of all American Bureaus of Identification employ I.A.S. students or graduates. We can prepare you for this fascinating work during spare time. Write today, **stating age,** for "Blue Book of Crime."

INSTITUTE OF APPLIED SCIENCE, 1920 Sunnyside Ave., Dept. 136-B, Chicago 40, Ill.

$50 IS YOURS!

FOR SELLING ONLY 100 BOXES CHRISTMAS CARDS

to your friends and fellow workers. 21 for $1 and 50 for $1.25, with name on. Selling plan and samples on approval. Costs nothing to try.

JEWEL CARD CO.
366 Plane St., Dept. 19, Newark, N. J.

Worry of FALSE TEETH Slipping or Irritating?

Don't be embarrassed by loose false teeth slipping, dropping or wobbling when you eat, talk or laugh. Just sprinkle a little FASTEETH on your plates. This pleasant powder gives a remarkable sense of added comfort and security by holding plates more firmly. No gummy, gooey, pasty taste or feeling. It's **alkaline** (non-acid). Get FASTEETH at any drug store.

TUBE GIVEN WITH EVERY TIRE AT NO EXTRA COST

Why Pay More!

SUMMER SPECIALS—AT LOW PRICES
SAVE TIME—SAVE MONEY—SEND THIS AD

GOOD USED TIRES—NOT RECAPS
19 YEARS AT THIS ADDRESS
BE WISE—A TRIAL OF ONE
TIRE WILL CONVINCE YOU.
19 MONTHS WRITTEN GUARANTEE

600-16	$4.05	820-15	$5.35	600-20	$7.05	32x6(8)	$8.55
650-16	4.05	700-15	4.35	650-20	7.65	32x6(10)	9.85
700-16	5.05	670-15	4.55	700-20	8.45	900-20	13.25
650-15	4.05	710-15	4.75	750-20	8.55	1000-20	13.85
760-15	5.05	550-17	5.55	825-20	14.85	1100-20	14.85

EXTRA SPECIALS—29 MONTH WRITTEN GUARANTEE

600-16	$5.55	EXTRA	SPECIALS—29 Month	Written	Guarantee		
600-16(6)	6.55	550-15	$6.05	700-15(6)	$8.95	700-20	$11.85
650-16	5.65	640-15	6.15	750-16(8)	12.75	750-20(8)	12.45
650-16(6)	6.95	670-15	6.15	700-17	10.05	750-20(10)	14.85
700-16	6.75	710-15	6.15	750-17	12.05	825-20	18.45
750-16	7.55	760-15	6.45	750-15	14.05	900-20	18.75
525-18	5.75	800-15	6.75	825-15	16.05	1000-20	19.75
550-17	5.75	820-15	6.75	600-20	8.85	1100-20	20.75
650-15	5.75	670-16	6.35	650-20	9.85	1200-20	23.75
700-15	6.45	760-16	6.85	32x6(8)	10.05	1000-22	19.65
Whitewalls	$1.00	Extra		32x6(10)	13.85	1100-22	21.65

Thousands of tires shipped all over U. S. A. All tires shipped F.O.B. Phila. Send Check or M.O. with this ad. Dept. 5.

STANDARD, 834 N. Broad St., Philadelphia 30, Pa.

THE ART OF DRAWING

Fascinating learn-by-doing lessons in drawing, painting, illustrating and commercial art. Prepared for YOUR instruction and enjoyment in spare time at home. Purpose: To turn amateur talent into PROFESSIONAL skill. Cost? Surprisingly low. Send for FREE illustrated booklet, "Building a Future" in Art. Write today.

GRANT SCHOOL OF ART Dept. B72, 225 N. Michigan Avenue, Chicago 1, Illinois

Learn MECHANICAL DENTISTRY

A profession offering unlimited opportunities. Most modern and complete course embracing every branch from Plate to Porcelain Work, which prepares you to work for Dentists or start your own business. Individual instruction—practical training in day or night school. No books—no classes. Catalog upon request.

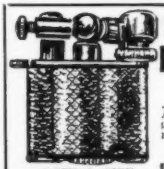
McCARRIE SCHOOL of Mechanical Dentistry
207 N. Broad Street Dept. 925 Philadelphia, Pa.

MAKE YOUR OWN! WITH

GRIFFIN LEATHERCRAFT KITS

Best assortment of tools, materials in U. S. A.! Send 25¢ for 116-page catalog. *(money refunded first order)*

GRIFFIN CRAFT SUPPLIES
SINCE 1924
5626-B Telegraph Ave., Oakland 9, Calif.



ACTUAL SIZE

SMALLEST CIGARETTE LIGHTER in the WORLD!

NO BIGGER THAN A POSTAGE STAMP

. . . yet it lights every time. All metal precision-made Alligator Skin metal covering. A most unusual gift.

$1.00 postpaid

FULL MONEY BACK GUARANTEE
R. L. ENTERPRISES, Dept. A
P.O. BOX 81 UNION CITY, N. J.

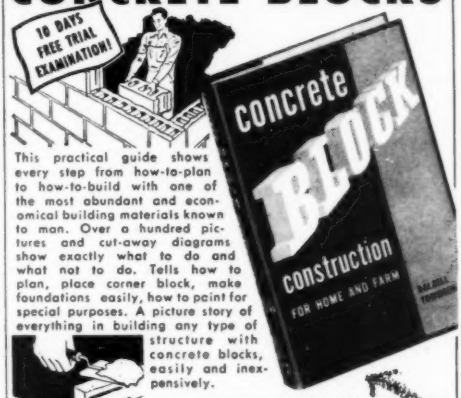
SOUND POWERED PHONES

No batteries needed. Your voice generates current. O.K. for 25 miles. Perfect intercom for shop, office, farm, darkroom. WAR SURPLUS. Orig. Govt. Cost $58.00 ea.

$10.95 Each *MONEY BACK GUARANTEE*
Postage Prepaid on Cash Orders

Semlers' ASSOCIATED SURPLUS
Dept. P-120, 5730 Wilshire Blvd., Los Angeles 36, Calif.

NOW YOU CAN BUILD IT WITH CONCRETE BLOCKS

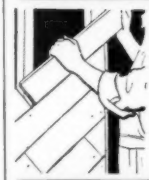


This practical guide shows every step from how-to-plan to how-to-build with one of the most abundant and economical building materials known to man. Over a hundred pictures and cut-away diagrams show exactly what to do and what not to do. Tells how to plan, place corner block, make foundations easily, how to paint for special purposes. A picture story of everything in building any type of structure with concrete blocks, easily and inexpensively.

Here's how to apply Mortar

Here's how little this book costs you . .
or if you don't keep it after 10 days trial, return it and you owe nothing. $2.75

CARPENTRY FOR EVERYONE



A clear explanation of modern carpentry construction including framing, roof constructions, general carpentry work, exterior and interior finish of buildings, building forms and working drawings, and farm buildings. Covers everything you need to know about lumber, tools, joints and splices, floors, stairs, partitions, rafters, etc. Gives short cuts and tricks used by the master carpenter. Easy to understand. 504 pages, 580 illustrations. **$2.50.** Use 10 day no-cost trial coupon below.

INSTALL & REPAIR YOUR OWN PLUMBING

How to Design and Install Plumbing by A. J. Matthias, Jr. A completely up-to-date guide that fits the needs of the beginner yet so complete that even the master plumber can pick up some new tricks of the trade. Contains hundreds of illustrations, full size blueprints, specifications and instructive details for septic tanks, storm drainage, soil pipe, water supply, fixtures, traps, drains, pumps, etc. An outstanding feature is complete design and installation of plumbing in a modern six-room, two bath residence. 349 illustrations, 442 pages. $3.95. Use coupon.

Mail this coupon today—10 days trial at no cost to you

American Technical Society, Dept. CB-20
848 East 58th Street, Chicago 37, Illinois

Please rush me the following books I'm checking below to examine at home. If I'm not convinced these books will help me save thousands of dollars by doing my own building and planning, I may return the books and owe nothing.

Examine at home or no cost.

- ☐ CONCRETE BLOCK CONSTRUCTION FOR HOME AND FARM.....$2.75
- ☐ CARPENTRY $2.50
- ☐ HOW TO DESIGN AND INSTALL PLUMBING $3.95
- Other How-to-do-it books, profusely illust.
- ☐ Painting and Decorating $1.75
- ☐ Electric Wiring—Residential and Farm.$3.95
- ☐ How to Insulate Home & Farm Bldgs...$3.00
- ☐ Bricklaying—Skill and Practice.....$3.00
- ☐ Steel Square $2.25

Name_____

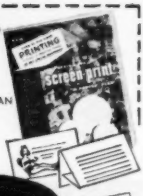
Address_____

City_____ State_____

- ☐ Ten day no-cost-trial. If I keep books, will remit by check or money order.
- ☐ Send C.O.D. Same return privilege—money refunded.
- ☐ I'm enclosing $_____ now to save postage—same return privilege—money refunded.

FREE BOOK AND ACTUAL SAMPLE

Screen Print, Dept. 17
1010 So. Los Angeles St.
Los Angeles 15, California
Dear Mr. Nowak: Please rush me FREE BOOK, ACTUAL SAMPLES, and your amazing new PRINTING PLAN
Name _____
Address _____
City _____ State _____



C. J. NOWAK
General Manager

IT'S AMAZING! I'll show you how to make up to $12.50 per hour

PRINTING
WITHOUT A PRINTING PRESS

AT HOME SPARE TIME

Print paper of all kinds

PRINT BANNERS

PRINT FABRICS

PRINT INSTRUMENTS

PRINT SIGNS

FOR SALE

AMAZING NEW COLOR PRINTING METHOD

A fascinating new miracle-way to print—a secret method that lets you print colorful signs, posters, banners, drapes, wallpaper, flags, glass, fabrics—ANYTHING without an expensive printing press or costly equipment. This new process is revolutionizing the entire printing industry—it's one of America's fastest-growing businesses—it's your "chance of a lifetime" to make Big Money Now! Be the FIRST in your area to profit. The secret can be yours—just mail the coupon above today!

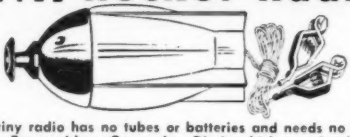
EASY TO LEARN! NO EXPERIENCE NECESSARY! Simple fascinating method! No artistic ability needed. It's possible for anyone (young or old) to make up to $50 PER WEEK printing in SPARE TIME alone—AT HOME!

START YOUR OWN BUSINESS—BE YOUR OWN BOSS Wouldn't you be happy if you could take only one hour of your time and $1.00 worth of materials—and sell your printing for $15 or more. It's that easy! It's amazing! Your home can be your office—No selling because there's a huge demand everywhere. GOVERNMENT CONTRACTS AVAILABLE TO BID. Biggest opportunity in America—costs you nothing to receive all CONFIDENTIAL FACTS — Mail coupon today!

SCREEN-PRINT
1010 S. Los Angeles St., Los Angeles 17, California

YOU CAN PRINT ANYTHING WITH SCREEN PRINT

LITTLE Rocket Radio



This tiny radio has no tubes or batteries and needs no electricity. Powered by a Germanium Diode which was developed for radar. Has tremendous qualities for picking up radio signals. Beautiful and colorful plastic case. Will work anywhere you go and pick up programs from local stations. Only $3.98 postpaid or on C.O.D. Pay postman plus delivery charges. Wonderful for children and a practical gift.

MARDO 480 LEXINGTON AVE., DEPT. R-197 NEW YORK, N. Y.

A "GOOD HAND" HELPS YOU SUCCEED!

LEARN TO WRITE WELL

Your Name beautifully written, plus special pen-point for shaded writing. Only 10¢

OUR 53rd YEAR

Handwriting quickly improves with our easy-to-understand picture lessons! Put your spare time to good use; send today for ☐ FREE BOOKLET, "How to Become a Good Penman," or check volumes wanted below at $1 each: ☐ Business Writing ☐ Artistic Writing ☐ Card Writing ☐ Bird & Design Flourishing ☐ Engrossing Alphabets. COMPLETE SET $4.50. Ask for price list of penman's supplies.

TAMBLYN SCHOOL of PENMANSHIP
S. A. Ziller, Pres. 438 Ridge Bldg., Kansas City, Mo., USA

Secrets of VENTRILOQUISM Now Revealed!

Easy to learn in 60 to 90 days with our Home Study Course. **RESULTS GUARANTEED.** Make Money! Be Popular! Have Fun! Big Opportunity! Radio, Television, Stage Appearances! For Free Information regarding price and terms, WRITE. You must state your age. Dummy Catalog 25c.

FRED MAHER SCHOOL OF VENTRILOQUISM
Box 36, Studio 7 Kensington Station
Detroit 24, Michigan

LAW FREE BOOK

Your **FREE** copy of **"The Law-Trained Man"** shows how to gain prestige and greater earnings through Blackstone home law study. All instruction material furnished including 16-volume Law Library written by 65 well-known law authorities. Lawyers, judges among our graduates. LL.B. degree. Low cost; easy terms. Write today.

BLACKSTONE COLLEGE OF LAW Dept. 120B, Chicago 1, ILL. 225 N. Michigan Ave.

A Correspondence Institution Founded in 1890

HIGH POWER TELESCOPE

60 POWER—ALUMINUM TUBES—OPENS TO 33"

Variable Power Eyepiece Adjustable to 15X, 30X, and 60X.

$5.95

Leather Case Included

5 Sections, 4 Ground & Polished Lenses. Also used as 50X Microscope. Ready to use, only $5.95. POSTPAID.

CRITERION CO. DEPT. SA7 438 ASYLUM ST. HARTFORD 3, CONN.

ENGINEERING DEGREE IN 27 MONTHS

Big Demand for Graduates

AERONAUTICAL, CHEMICAL, CIVIL, ELECTRICAL, MECHANICAL and RADIO ENGINEERING (inc. TV and Electronics).

Hundreds of young men are earning **B.S. ENGINEERING DEGREES** annually in this recognized institution—year around operation. New terms start quarterly. Many students earn a major part of their college expenses in this large industrial center.

Low tuition. Competent instruction. Thorough, intense, practical program. Modern, well-equipped laboratories including new physics laboratory and modern wind tunnel. Individualized instruction emphasized.

Gov't approved for G.I.'s. Engineering preparatory courses. Students from 48 states and 21 foreign countries. Enter September, December, March, June. Send coupon for free catalog and full information. Enroll now.

SEND COUPON TODAY

INDIANA TECHNICAL COLLEGE
672 E. Washington Boulevard
Fort Wayne 2, Indiana

Please send me free information on B. S. Engineering degree in 27 months as checked.
☐ Aeronautical, ☐ Chemical, ☐ Civil, ☐ Electrical, ☐ Mechanical, ☐ Radio-Television.

Name _____
Address _____

ILLUSTRATED COMIC BOOKLETS
FOR MEN ONLY! POCKET SIZE!

THEY'RE TERRIFIC! PACKED WITH RARE CARTOONS *and* GOOD CLEAR ILLUSTRATIONS AS YOU LIKE IT. RICH IN FUN *and* HUMOR. *20 BOOKLETS* ALL DIFFERENT, SENT PREPAID FOR $1 IN PLAIN SEALED WRAPPER. NO C.O.D.s.

NATIONAL, Dept. 478, BOX 5-STA. E, TOLEDO 9, OHIO

Buy U. S. Savings Bonds

If Ruptured

TRY THIS!...

If you can obtain relief by holding back your rupture or ruptures in this manner—**I CAN HELP YOU!** Write today for my valuable FREE information which is based on 23 years of practical experience.

FRED B. MILLER, Mfgr.
Dept. P. Hagerstown, Maryland.

If you can draw, your future is secure

America's **12** Most Famous Artists

now test your art talent!

Thousands paid $1.00
to take this amazing test.
To meet the ever-increasing demand
for artists needed for higher-paying jobs,
this talent test is now offered
FREE. Quantity limited. Write today!

This exciting test, printed on 8 large pages of 11" x 14" drawing paper, has over 50 illustrations. It tests you seven ways to show your sense of design, composition, form, observation, imagination, originality and picture sense. Yours if you act today.

FAMOUS ARTISTS COURSE
Studio 11-G, Westport, Connecticut
Without obligation I would be pleased to receive the Famous Artists Talent Test.

Mr.
Mrs.....Age.....
Miss (please print)
Address.....

City.....Zone.....State.....

Regular 25¢ Package Sent

FREE

Original **RUM and MAPLE**
BLEND No. 53
THE FRIENDLY PIPE MIXTURE
• **GOOD** . . . by itself
• **GOOD**. . as a mixer with other tobaccos!
Send postcard to Dept. P
RUM and MAPLE TOBACCO
New York City 3, N. Y.

BUY RUM & MAPLE CIGARETTES

MAKE EXTRA MONEY **PLASTICS** LEARN AT HOME

LEARN HOW TO MAKE fast-selling PLASTIC NOVELTIES FURNITURE JEWELRY SIGNS TOYS LAMPS

There are RICH OPPORTUNITIES for MEN and WOMEN with "know-how" in Plastics. Interstate's new Plastics course tells and shows how to make hundreds of fast selling items out of Plastics. Gives complete training in fabrication, casting, lamination, molding, internal carving, etc., in simple, easy, step-by-step language and pictures. Plastics and Fabricating Kits for 23 valuable Plastic items come with training at no extra cost. START A PLASTICS BUSINESS OF YOUR OWN. No other industry holds such promise for the future. You can make big money manufacturing novelties, toys, signs, etc., in your own home in spare or full time. Don't wait! Learn NOW how Interstate's Plastics Training qualifies you for success in the Plastics field.

WRITE TODAY!

PLASTICS AND SUPPLIES FURNISHED FOR 23 VALUABLE PROJECTS

INTERSTATE TRAINING SERVICE
Dept. 2CG Portland 13, Oregon

LEARN **DRAFTING**
TODAY'S IMPORTANT JOB

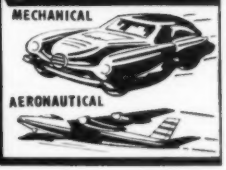
It's Easy—At Home In Your Spare Time

There is a growing, desperate need for draftsmen—the key men in all industry. CEI can quickly give YOU the necessary technical skill. Bigger income, jobs, and opportunities are yours with a CEI diploma. Thousands have succeeded. So can you! CEI guarantees to train you until you qualify. Write today!

You Get This Professional Set of Instruments at no Extra Cost

Cleveland Engineering Institute
Extension Division PS7B
6300 Euclid Avenue,
Cleveland 3, Ohio
( ) Aeronautical ( ) Mechanical
NAME.....
ADDRESS.....
CITY.....STATE.....
No Obligation—No Salesmen

get FREE success book



CLEVELAND ENGINEERING INSTITUTE

$15-$20 in few SPARE HOURS
UP TO $210 A WEEK FULL TIME

Easy with Amazing D-FROST-O-MATIC

"Never defrost your refrigerator!"—4 magic words that can pay you as much as $15.00 to $20.00 and more in just a few hours showing housewives how amazing D-FROST-O-MATIC *ends forever* the messy, sloppy, time-wasting task of defrosting by hand!! D-FROST-O-MATIC makes any electric refrigerator AUTOMATICALLY SELF-DEFROSTING! And talk about easy sales! Just plug in D-FROST-O-MATIC, tell the housewife to "try it before you buy it" and when she sees how D-FROST-O-MATIC saves time, work, food, and money—she won't let you take it out! That's why 9 out of 10 FREE TRIAL installations are almost certain sales with *big cash profit for you.* Many D-FROST-O-MATIC men sell 5, 7, 10, and more units IN A DAY on this sure-fire FREE TRIAL Plan!

SELLY of California started in his spare time and now sells 1000 D-Frost-O-Matics a month!

Rush Name Today for Profit Details and FREE TRIAL PLAN!

More than **29,000,000** prospects waiting! Rush your name and address today. We'll airmail exciting facts, proof and sure-profit Free Trial plan. No obligation. Write today.

D-FROST-O-MATIC, Dept. K-14
173 W. Madison Street, Chicago 2, Ill.

Learn TELEVISION RADIO—ELECTRONICS

Prepare in spare hours for good pay in Television, Radio and Electronics. Train at home with Frank L. Sprayberry, America's outstanding Radio instructor. Big Kits of equipment furnished. Build testers, sets, etc. VETERANS: Approved for Training under GI Bill. Rush name and address for details and 2 BIG RADIO BOOKS—**ALL FREE!** No salesman will call. Write today!

2 Big Books FREE!

Sprayberry Academy of Radio, Dept. 55-L
111 N. Canal Chicago 6, Illinois

Start as high as $3,795.00 a year!

U.S. GOVERNMENT JOBS

Veterans Get Preference

Men—Women

Prepare NOW for next examinations

Mail-Coupon today sure!

COUPON

Franklin Institute, Dept. K-80, Rochester 4, N. Y.
(Not Govt. Controlled)

Sirs: Rush to me without charge (1) 32-page book with list of U. S. Government jobs. (2) Tell me how to qualify for one of these jobs.

Name.....

Street.....

Address.....Age.....

Wake Up To More Comfort

Without Nagging Backache

Nagging backache, loss of pep and energy, headaches and dizziness may be due to slowdown of kidney function. Doctors say good kidney function is very important to good health. When some everyday condition, such as stress and strain, causes this important function to slow down, many folks suffer nagging backache—feel miserable. Minor bladder irritations due to cold or wrong diet may cause getting up nights or frequent passages.

Don't neglect your kidneys if these conditions bother you. Try Doan's Pills—a mild diuretic. Used successfully by millions for over 50 years. It's amazing how many times Doan's give happy relief from these discomforts—help the 15 miles of kidney tubes and filters flush out waste. Get Doan's Pills today!

Study **HYPNOTISM!**

FASCINATING! *Almost Unbelievable*

This unusual course reveals the fundamentals of PRACTICAL hypnotism. It discloses how an expert operator performs—how he has developed his PERSONAL POWER and uses it to bring others under his domination and control. Illustrated instructions. Startling **low price.** Full satisfaction or refund guaranteed. Only $2.95 postpaid . . . or C.O.D., plus postage. Send for "Hypnotism Course" today!

COMPLETE PRICE $2.95

NELSON-HALL CO., 210 S. Clinton St. Dept. 2-GY-1 Chicago 6, Ill. only

LAWN ORNAMENT-NOVELTY PATTERNS

28 Lawn Ornament Patterns, 25c. Other patterns: 15-20" high: Dutch Girl, Dutch Boy, Pirate, Bull Terrier, Mexican Girl, Mexican Boy, Dwarf, Penguin, Flower Girl, 10c each. 25 Novelty Patterns, 30c. All 62 Full Size Patterns, $1.00 Postpaid.

FLYING DUCK

Wind revolves wings. Realistic appearance. Pattern, Instructions and wing Pinion Kit: brass bearing, steel shaft, wing lugs, bolts, nuts and washers, 50c. Pattern and Instructions without kit, 25c. Postpaid.

STROTHER PATTERN SERVICE
Dept. 7-CQ Box 128 Bellington, W. Va.

SHOCKING BOOK!

SENSATIONAL! The "reader" is literally shocked with this book. The effect can be compared to taking hold of an electric eel.

Inside is an ingenious device that delivers an electric shock when the cover is opened. The shock is perfectly harmless and the joke can be played hundreds of times.

Sent postpaid for $3.00 (no COD's please)

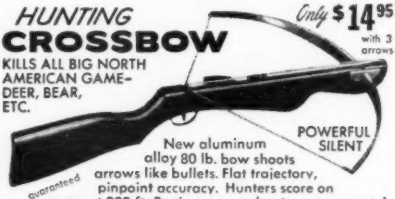
GARDEN CITY FUN SHOP, Joke Dept.
Box 246 Garden City, N. Y.

When Writing to Advertisers Please Mention Popular Science

HUNTING **CROSSBOW**

Only **$14.95** with 3 arrows

KILLS ALL BIG NORTH AMERICAN GAME—DEER, BEAR, ETC.



New aluminum alloy 80 lb. bow shoots arrows like bullets. Flat trajectory, pinpoint accuracy. Hunters score on game at 200 ft. Beginners can shoot more accurately than professional archers. Shoot rabbits and squirrels easily. Exciting sport, more fun than rifle shooting! Beautiful heavy duty ash hardwood stock. Using foot support, cocks easily as 40 lb. longbow. Adaptable to harpooning. Complete with 3 arrows, hunting, target instructions. Parts available. Additional arrows 60c each. **YOUR MONEY BACK IF YOU ARE NOT COMPLETELY SATISFIED.** Only $14.95 postpaid. Send to **TECHRITE CORP., Box F-12 South Pasadena, Calif.**

Make $20 to $30 a Day with this new ONE MAN

MAIL ORDER BUSINESS

DO PLASTIC LAMINATING AT HOME!

Would you like to get orders and cash from your mailman—then in space of hours make and ship the things people ordered from you? If you have spare time and a little spare room in kitchen, garage, or basement, get the facts about the newest and most fascinating of all home operated businesses. For the first time a simplified machine brings the fabulous profit of **Plastic Sealing** and **Plastic Laminating** within the reach of the small operator. Any one can learn to operate the machine with a few minutes practice—then with our **Magic Mail Plan** can get mail orders pouring in daily with cash in every envelope. No canvassing—no selling. We even supply the circulars you mail to bring back cash and orders. Don't waste a minute. Rush your name. We'll send you, FREE and postpaid, pictures, prices, details, all the facts you need to start. Mail coupon or send name on postcard. No charge.

WARNER ELECTRIC CO., 1512 Jarvis Av.
DEPT. L-9-M - CHICAGO 26, ILLINOIS

THIS MAN . . .

. . . is taking out of the machine a Plastic Sealing Job—ordered by mail—only 11c in material cost brings back $2.58 in cash by mail. Capacity of machine: **$25.00 profit per hour of operation.**

Make Thousands of Beautiful Art Creations

COSTUME JEWELRY • CIGARETTE BOXES
TRAYS • CANDLESTICKS • COASTERS
LAMP BASES • BOOK ENDS...ALL IN SPARKLING COLORED PLASTIC

WARNER ELECTRIC CO., 1512 Jarvis Av.
Dept L-9-M Chicago 26, Ill.

At no cost to me, please rush complete details postage prepaid. I am under no obligation.

*Name*_____

*Address*_____

*City*_____ *Zone*____ *State*_____

GET YOUR **Dandy** LATTICE BACK REST

Be comfortable in hottest weather. Let air circulate behind your back while driving. Get this new Dandy Lattice Back Rest, made of finest material. Send name and address for C.O.D. delivery. Or send $3.95 and get your Back Rest sent prepaid. Satisfaction guaranteed or money back.

VEALE MFG. CO. — COLUMBUS, IND.

Original

LOVE STAR GEM

"New Gem more brilliant than a diamond", says Saturday Evening Post. Give her a LOVE STAR ENGAGEMENT RING with Titanium Rutile Gem whose beauty and fire is unsurpassed. Guaranteed forever. Lady's ring set in gold mounting, one carat LOVE STAR GEM, **$29.76** incl. tax; two carat **$39.60** incl. tax . . . Man's ring, one carat LOVE STAR GEM, **$33.60** incl. tax; two carat **$44.40** incl. tax. Send cash, check or money order TODAY. Absolute satisfaction or money-back.

NEIL SALES CO. DEPT. 3, 1306—10TH AVE., SAN FRANCISCO 22, CALIF.

OIL *From the* **PUBLIC LANDS**

Are you an American citizen over 21? Do you know you have the right to file for an oil and gas lease on United States Public Lands, located mostly in the oil-booming Western States?

It's not too late! Choice lands are still open because few outside of the oil business know their rights on the Public Domain, and each citizen, each oil company, is limited in the holdings it may have. Some U.S. oil leases have lately paid $150,000 for under $200; $250,000 for $250; from $4,000 to $12,000 MONTHLY for less than $200.

You can participate without leaving home. We follow oil activity in Western States; we locate government land in possible oil areas; we file your application. Our $200 fee for 40 acres covers all expenses for 3 years. Scores of our clients have sold U.S. leases we obtained for them to major oil companies, keeping part of the oil for themselves. Send now for free booklet.

CALIFORNIA LEASE CO.
Bonded Oil Lease Brokers
7075P Hollywood Blvd., Los Angeles 28, Calif.

GROW Living MIDGET TREES!

EARN $10.00 PER HOUR
•AT HOME
•IN SPARE TIME
•NO EXPERIENCE NEEDED

It's new! Amazing! At last, the secret of growing miniature (MING) trees can be yours. FULL GROWN, dwarf trees — only a few inches high. Beautiful miniature fir, orange, oak, Chinese elm, peach, pine, cypress—any kind! ALL BLOOM and even BEAR FRUIT. All perfect healthy specimens—but miniature in size! Make costly home decorations and expensive centerpieces. (SOLD FOR OVER $1,500 EACH) Big demand. Costs only pennies—takes only minutes per week. IT'S EASY! Fun! A new fascinating hobby—a new fabulous $$$$ business. Send for free secret plan details and real seed.

HELP US FILL HUGE DEMAND!
These trees are being demanded by STORES CLUBS • HOTELS • FLORISTS • HOUSEWIVES • INTERIOR DECORATORS • COLLECTORS • HOBBYISTS — A Big Money Opportunity FOR YOU.

FREE! GENUINE SEED AND PLANT

NATIONAL NURSERY GARDENS, Dept. N7
8463 South Van Ness
Inglewood 4, Calif.
Rush me FREE plan and seed IMMEDIATELY!

Name_____

Address_____ Zone____

City_____ State_____

We teach you FREE!

We put you in Business!

HERE'S THE BIG OPPORTUNITY FOR YOU! Learn a new and fascinating occupation . . . a wonderful hobby . . . and MAKE MONEY AT THE SAME TIME! OPERATE AT HOME OR IN A SMALL SHOP! AND . . . the complete Instructions . . . books, lessons and personal guidance COST YOU NOTHING! We teach you FREE how to make the most beautiful jewelry you have ever seen: door-knobs imbedded with interesting objects, nite-lites, book-ends, coasters, name-plates, ash trays, paper weights, statues, figurines, souvenirs, novelties, gadgets, etc. . . . an endless variety of high-quality, highly saleable products out of LIQUID MARBLE, TRANSPARENT GEM-LIKE LIQUID PLASTIC, CERAMICS, PLASTER, COMPOSITIONS, STONE, ETC! All without tools or machinery! The manufacture of these lovely objects is as easy as pouring water out of a glass! And—you learn how ABSOLUTELY FREE! The only limitation is your own IMAGINATION! No special talents or experience are required!

You get more than the FREE INSTRUCTIONS! We also show you methods of *selling your finished work* . . . even selling part of it to us! Start on a shoe-string! And overnite, become established in one of the most fascinating and profitable occupations in existence.

Just send 25c for our big catalog, "CASTING MATERIALS, MOLDS, ETC,"—and you're on your way! Along with the catalog we will include the book, "THE ART and BUSINESS OF CASTING" absolutely FREE! And—surprising details on an amazing, exclusive Plasticast offer guaranteeing your success! DON'T DELAY! This could be the most important step of your lifetime! WRITE TODAY!

PLASTICAST CO. (Dept. A)

P.O. Box 6737 *(Write to nearest address)* **P.O. Box 987**
Chicago 80, Ill. **Palo Alto, Calif.**

CANADIAN CUSTOMERS: Send 35c for catalog to Canadian Ind. PLASTICS, 1056½ W. Pender St., Vancouver, B.C.

BRAND NEW

30 DAY FREE TRIAL

High Power BINOCULARS

Finest Precision Optics
Featherlight
Money Back Guarantee
Easy Pay Plan
Leather Case Incl'd.

33 MODELS
$14.95 up

Free! Catalog & Book
"How to Select Binoculars"
Dealer Inquiries Invited

BUSHNELL *Binoculars*

Bushnell Bldg., Dept. P47
Pasadena 1, Calif.

Whether You Need $10 or $110

You Can Make It *EASILY* with ARTISTIC Christmas Cards

Show newest, smartest 21-Card $1 Christmas Assortments in spare time. You make **$50** on 100 boxes! Make still more with Personalized Christmas Cards and Stationery low as **$1** per box. Other fast sellers. No experience needed. Assortments on approval, Personalized samples FREE!

Guaranteed by Good Housekeeping — REPLACEMENT OR A REFUND OF MONEY IF NOT AS ADVERTISED THEREIN

SEND FOR MONEY-MAKING SAMPLES TODAY!

ARTISTIC CARD CO., INC.
914 Way St., Elmira, New York

Please send full details with Assortments on approval, and FREE Personalized Samples.

Name _____

Address _____

City _____ Zone ____ State _____

WANT TO BE PAID FOR "GIVING AWAY" NYLONS AT 49c?

That's all they cost if they run or snag within guarantee period up to THREE MONTHS! Just write orders. We deliver and collect. Earn up to $26 weekly in spare time. Advance cash and big bonus. No experience needed. Write for FREE sample stocking and money-making outfit postage prepaid.

KENDEX CORP. • BABYLON 949, N. Y.

INVENTIONS WANTED AT ONCE

If you want to market, or sell, your invention for cash or royalties, we may be able to help you. *Write for Free Booklet.* Send no drawings. We also welcome hearing from firms wishing to review inventions in their field.

GLOBAL MARKETING SERVICE
1404 Mitchell Street Dept. SD Oakland 1, Calif.

BEING PUSHED AROUND??

Why take any more nonsense from bullys, wise guys and other pests? The next time they try to act smart—give them the surprise of their lives! It's easy when you know POLICE JIU JITSU! This complete, fully illustrated course comes to you in one volume. The same as taught to police, marines, "G" men, soldiers, sailors and members of the U. S. Coast Guard. By all means, just pin $1 to this ad and we will send POLICE JIU JITSU to you postpaid by return mail. Satisfaction guaranteed or your money back.

BOOKS PUBLISHING CO., 56 W. 24th St., N.Y. 10

AMAZING NEW POCKET SIZE RADIO
COMPLETE AS SHOWN—NO TUBES—BATTERIES OR ELECTRIC "PLUG-INS" NEEDED—Has new Crystal Diode and speaker-phone! Selective Clear tone. Gets local stations most anywhere you go. Should last for years.
Send $1.00 and pay postman $3.99 C.O.D. postage or send $4.99 for p.p. delivery. GUARANTEED. Rush order now!

MIDWAY CO.
DEPT. PPS-7 KEARNEY, NEBR.

MORE BRILLIANT than DIAMONDS

The New JARRA GEM looks exactly like the finest diamond. JARRA GEMS are white Gems possessing the same brilliant highlights found in *expensive diamonds*. Every Gem is individually hand-cut and polished...with full 58 facets. *Only JARRA GEMS come with a certification Bond.*

FREE BOOKLET tells amazing story. Shows earrings, pins, Ladies' and Men's rings in 14K gold.

EASY MONTHLY PAYMENTS IF DESIRED
Unset JARRA Gems $24 a carat (Tax incl.)

Jarra GEM CORP. Dept. S
489 Fifth Ave., New York 17, N.Y.

RUPTURED?

Get Relief This Proven Way

Why try to worry along with trusses that gouge your flesh—press heavily on hips and spine—enlarge opening—fail to hold rupture? You need the Cluthe. No leg-straps or cutting belts. Automatic adjustable pad holds at real opening — follows every body movement with instant increased support in case of strain. Cannot slip whether at work or play. Light. Waterproof. Can be worn in bath. Send for amazing **FREE** book. "Advice To Ruptured" and details of liberal truthful 60-day trial offer. Also endorsements from grateful users in your neighborhood. Write:

CLUTHE SONS, Dept. 14, Bloomfield, New Jersey.

Classified Ads only 80c per word per insertion, payable in advance. Minimum ad 10 words. To be included in September issue, copy should be in our office by July 24. No cancellations accepted after July 15.

CLASSIFIED OPPORTUNITIES

POPULAR SCIENCE MONTHLY-351 FOURTH AVE.-NEW YORK CITY 10

1 AUTOMOBILES & MIDGET CARS

"SPEED Equipment"—Save up to 50%. Hollywood Mufflers $4.95. Dual Mufflers $18.95. Header Kits $9.95. Cut Outs $6.95. Dual Intake Manifolds $12.95. Chrome Stacks $1.25. Racing Cams $29. Hi-Compression Heads $18.95. Water Injectors $5.95. Customizing Kits $1.98. Thousands of Accessories! Catalog plus "Soup-Up" Handbook 25c. Almquist Engineering. Milford 14Z. Penna. (Dealers Wanted)

POWERCAR Junior—Real Children's Auto! See details under "Motorcycles-Bicycles".

SAVE—California Custom Accessories headquarters. Buy direct from original designers. Chrome dash panels, electric push button door-trunk conversions, fender skirts, dual mufflers, lowering kits, speed-dress up equipment. 40 page catalog. Hundreds of photos—25c. Eastern Auto, 3319D South Grand, Los Angeles 7, Calif.

CROSLEY Car Owners Club. Members coast to coast. Actual owners opinions and experiences revealed through club bulletin. Free accessories offered. Tires recapped at a discount. Eye-catching windshield decal, identification card, etc. Write: Crosley Car Owners Club, 304 North Poplar, Charlotte, North Carolina.

NOW! News every week about Hot Rods, Sportcars, Stock Cars, Cycles, Boats, etc. Weekly "Motor Sports World," the motorsports newspaper. Send $1.00 for sample subscription (10 issues), or $4.00 for 52 issues. P. O. Box 12321-PS, Los Angeles 64, Calif.

AUTOMOBILE Literature—old, new and foreign; glossy photos; shop manuals, data books; free motor magazines. Write today; get on free mailing list. Auto Maniacs, Inc., Stockbridge Michigan.

MASSIVE Custom grills. Ford Mercury 49-52, for free literature, send to Gilbertcrafts, 15 Jessie Street, Brockville, Ont.

2 AUTO SUPPLIES & EQUIPMENT

1952 EDITION. It's New! It's Different! Get world's largest Auto Accessory & Parts Catalog and save money. 100 pages. Over 50,000 items, including Hollywood Accessories, Hi-Speed Equipment, Rebuilt Engines, all parts and accessories for all cars and trucks. We have that Hard-To-Get part! Jam packed with bargains. Completely illustrated. Send 25c (refundable). J. C. Whitney, 1919-T Archer, Chicago 16.

NEW and used guaranteed parts for civilian and Army cars and trucks. Largest stock in America. Mail orders. Pioneer Auto & Truck Parts Company, 788 W. 13th Avenue, Denver, Colorado.

"HOW to buy speed equipment without money." No selling. Information free. Newhouse Automotive Industries, Los Angeles 22.

BRUSH Plating Outfits connect to a battery. No tanks or shop required. Free particulars. Gunmetal Co., Ave. K, Decatur, Illinois.

CAR-Hammock, convert your car into a double bed at any time. Universal, works on 2 or 4 door Sedans, Club Coupes and Convertibles. No cutting your seats or soiling interior. Folds up when not in use for storage in trunk of car. Send $2.00 for complete plans and illustrations to Auto Bed Company, 301 West Sixth Street, Panama City, Florida.

FROM Speedway To Roadway! Track-proved Hi-Speed Heads and Manifolds for your passenger car! No special tools needed! Increase Horsepower 30%! Astounding Getaway! Illustrated Catalog. (Dealers Wanted). Speedsport, 4866-C Milwaukee, Chicago 30.

TIRES—wholesale all sizes. Free list. Field Tire, Dowingtown 7, Penna.

SPEED Equipment, Heads, Manifolds, etc. Catalog and Speed Manual 25c. Dealers wanted. Honsaker, Masontown, Penna.

LACHAPELLE'S Treatment. (Patented.) Puts bearings on the pistons, babbitt bearings for $3.00. Free data. Ferns, 8120-D Walnut Dr., Los Angeles 1, Calif. Cuba, Luis Izaguirre San Carlos 178, Cienfuegos.

FORD Mercury Studebaker, Chevrolet Catalog 25c. Weland Power Racing Equipment, 2733 San Fernando Road, Los Angeles 65, California.

STOP burning oil in your car. Get "Piston Seal" the original overhaul compound. Proven by 16 years use in millions of engines. Guaranteed safe, economical, easy to use. Saves money, oil, gas. Details Free! Write Now!! Automotive Aids, 201 East Fifth St., Plainfield 1, N. J.

BUY racing heads, dual manifolds, Hot coils, etc. without money. Information free. Newhouse Automotive Industries, Los Angeles 22.

BIG profits rebuilding starters, generators, regulators. Introductory manual $1. Modern Publishers, Box 4704, Kansas City, Mo.

89c GUARANTEED fire extinguishers sell fast, costing $5.89 dozen, $49.90 gross. E. Scheall, 263-P Duluth, Minnesota.

MOTORISTS Are reporting 3 to 5 more miles per gallon. Guaranteed Gasoline Vaporizer, increases Power, Easier Starting. $3.50. Turb-O-Vane, Stockton, Calif.

"WATER Injection" Airflow Needles. Economy methods. Free illustrated information. Neher Industries, LaVerne, Calif.

MOTORIST save gasoline by Vacu-mating overrich mixtures. Fits all cars. For Free particulars write Vacumatic, Dept. 1920, Wauwatosa, Wisconsin.

AUTO Radio Rear Seat Speaker Kit $9.95. Easily Installed—Complete Instructions. Details Free. "Caradio," Box 545 Riverdale Station, Dayton, Ohio.

WHEEL alignment recorder. Drive over. $22.50. Guaranteed. Align-A-Matic, 62 Gaston St., West Orange, New Jersey.

GAIN Mileage with Gane carburetor needles. Write Gane, Webster 2, N. Y., for Free Trial.

CHEVROLET Owners: Stop tappet noise with Kaye Tappet Silencers. Quality product. Easy to install. Money back guarantee. Complete set $5.95 Postpaid. Kaye Products, 1321C So. Layton Blvd., Milwaukee 15, Wisconsin.

SIRENS, Air Horns! Free accessory catalog: McCanna, 200-PS East 21st, New York 10.

NU-Charge Battery Chemical makes recharging obsolete. Regenerates discharged batteries, doubles battery life. Guaranteed. $1.50. Literature. Veterans Nu-Charge Sales, 2089 Madison, Memphis, Tenn.

NEVER Change Your Oil! Full details free. Thousands of users. You'll be amazed! Dept. TH, Henderize, Inc., 5667 Freeport Blvd., Sacramento, California.

ILLUMINATE your powerglide or dyna-flow dial. Information free. Gaiser, Box 25B, Kokomo, Indiana.

POWER for your car! Hi-Solvent increases power and performance. Amazing results. Fully guaranteed. Dealers wanted. Send $1.50 for 1 Qt. to Union Supply Company, 1525 Folsom St., San Francisco 3, Calif.

ELECTROPLATE Metals, Mirrors, Non-Metals. Portable Tyco Electro-Plater $5.95, including plating salts, formulas, electroplating manual. Tyco Metals, Box 13231-FB, Houston 19, Texas.

SPEED equipment from the World's largest firm. 25c for huge catalogue. Newhouse Automotive Industries, Los Angeles 22.

AUTO Liqui-Moly makes your oil 300% more efficient, protects your bearings even if all the oil burns up tighter bearings less heat less friction, contains no graphite. A Hot Rods Dream. 1 can $1.15 postpaid. 2 cans or more $1.00 each postpaid. Convincing literature free. Hal-Gas Auto Products, Box 912, Fonda, New York.

3 AUTO TRAILERS

BUILD your own trailer! Plans for all kinds. Illustrated catalog 10c. Jim Dandy, 128-S, Wausau, Wisconsin.

REPAIR, build, your own trailer with Plastic (Fiberglas-Polyester). Catalog—10c. Gem-O'-Lite, Box 686E, North Hollywood, Calif.

4 MOTORCYCLES, BICYCLES AND SUPPLIES

SERVICYCLE $15. Midget car $10. Dart motorscooter $17, less engines; Two cylinder opposed 5 horsepower engine $20, others $7.50 up. (Mail order only). Send 25c for catalogue number 47, listing these and hundreds of other bargains in midget cars, motorscooters, outboard motors, home-builders parts, plans, etc. (35c by First Class Mail). Midget Motors Directory, Athens, Ohio.

RECONDITIONED motorcycles and motors. Chromium accessories. Complete stock Indian parts. Expert rebuilding. Fast service. Indian Motorcycle Sales, Kansas City 1, Mo.

"BUZZZZ" Magazine. Describes, Illustrates Motorcycling Completely. $2.00 year, 20c copy. 5424-A Sawyer, Chicago 25.

GOOD Whizzer $20; Motorscooter (twist grips) $22.50; Midget car $15; Shaw bicycle motor $15. Send 25c (35c first class mail) for catalog #20 jammed with sensational bargains in wheels, motors, clutches, motorscooters, midget cars, motorettes, motorbikes, etc. Gail, 538 Erie, Toledo, Ohio.

WHIZZER motor $5; Cushman motorscooter $15; Indian motorcycle $30; Engines $3 up; Motorbike frame $3. Rush 25c (35c first class mail) for catalog #951 listing many other amazing bargains in motors, midget cars, motorscooters, motorbikes, etc. Associated, Box 1764-CS, Toledo, Ohio.

POWERCAR Junior—Real Children's Electric Auto . . . Plenty of power for hills, towing wagons, etc. Catalog free. Mystic River Sales, Dept. Q7, Mystic, Conn.

REBUILT Gasoline Engines, $28.00 to $47.00. Cauffiel Motor Industries, Temperance, Michigan.

5 AVIATION

GOVERNMENT book on Career Opportunities in Aviation 15c. Ross Aero Publishers, Tulsa, Oklahoma.

6 BATTERIES, GENERATORS, ETC.

EDISON Non-Acid Storage Batteries. Amazing long life. Any voltage. 37 to 600 ampere hour sizes. Lighting Plants, Generators, Motors. Literature. Hawley Smith Co., Croton Falls 2, New York.

7 ELECTRICAL SUPPLIES & EQUIPMENT

LAMPS—Had trouble finding repair parts? Your search is ended. 25c brings 64 page illustrated catalog containing wiring charts, Gyro Lamps. 5402B Clark, Chicago 40, Illinois.

TELEPHONES—Telephone Wire, Solve communication problems with Army Field Telephones. Anyone can install, operate. Free folder. Loris Sales, Box 1896-A, Sacramento, Calif.

LAMP Supplies — Wholesale — any amounts. Prompt shipment on all parts for repairing and building lamps. Illustrated catalog 15c. Brown Lamp Co., No. 501, Wellston Sta., St. Louis 12, Missouri.

ELECTRIC motors buy now ¼ and ⅓ H.P. special $13.95 ea. F.O.B. Seattle. Send check or M.O. Greenlake Electric, 1012 East 45th, Seattle, Washington.

8 WELDING, SOLDERING

A.C. Welders. Four Sizes. Lowest Prices. Free literature. Holgerson's Service, Canton, Kansas.

9 MACHINERY, TOOL SUPPLIES, ETC.

LATHES, shapers, millers—build 'em yourself from unfinished castings. Send 25c for single construction drawings. $1.00 for drawings of shaper, three millers, three lathes. Pootatuck Corporation. 155 Sammis Place, Stratford, Conn.

BUY good machines for your shop. 30"x24' screw-cutting engine lathe $940.00; 13"x6' Quick change $440.00; New bench lathes 10½"x38" $250.00; 16" shaper $280.00; 5 ft. radial drill with motor $840.00; Vertical attachment with motor $150.00; new 9/16" wire rope 15c foot. Conversion Part Co., 277 Adams St., Boston 22, Mass.

SURPLUS Lathes, Milling Machines, Surface Grinders, Motors, Small tools. List 25c refunded. Model Tool Service, Rock Falls, Illinois.

POWER tools, equipment wholesale prices. Free bulletin. Homecrafters Cooperative, Grand Rapids 6, Michigan.

DRILLS, New high speed, Fractionals, numbered, sets, or dozens. Real savings. Instrumechanics, Box 2153, Pittsburgh 30, Pennsylvania.

10 ENGINES, MOTORS, ETC.

WINDING Data, listing 225 motors, single and three phase $1.00. Motor Data, Box 7631, Kansas City 3, Mo.

REBUILT Gasoline Engines, $28.00 to $47.00. Cauffiel Motor Industries, Temperance, Michigan.

GEARHEAD Motors ⅓ H.P. Standard Motors with six output shaft speeds, the motor of 1,000 uses. Write for literature. Vine, Hill & Co., Box 35P, Swanton, Ohio.

11 BOATS, OUTBOARD MOTORS

FULL size, cut to shape boat patterns, blueprints, 7½-38 feet. Illustrated "Build a Boat" catalog 25c (coin). "How to Build Boats" book, $1.00. Cleveland Boat Blueprint Co., Dept. A-77, Cleveland 13, Ohio.

NEW, used, rebuilt marine motors. Marine conversions, fittings. Free Catalog. Stokes Marine Supply, Dept. 23, Coldwater, Mich.

SAVE 2/3 cost. Assemble your own boat. We furnish parts. No experience necessary. Rowboats, Cruisers. Illustrated Catalog 25c. Midwest Boat Company, Menomonee Falls 1, Wisconsin.

FASTEST Boats in the World! Build your own Champion Boat or let us build you a custom-made racer or family runabout. Send 25c today for catalogue of easy-to-follow plans for 3 point hydroplanes, runabouts and others. Dealer inquiries invited. Champion Boats, 1524 W. 15th St., Dept. 23-T, Long Beach 13, Calif.

OUTBOARD Motor Parts—New—Used for all makes. Send stamp for price quotation, listing parts needed. Outboard Motor Mart, Inc., 229D State Street, Boston, Massachusetts.

CURE that leaking boat with Fiberglas-Plastic covering. Ends caulking and painting. Nationally approved process. Easily applied, complete instructions. Industrial Plastics, 3807 Harrison Street, Oakland 11, California.

MARINE conversions for Ford and Jeep engines. Catalog 10c. Lehman Manufacturing Co., 972A Broad St., Newark 2, N. J.

REPAIR, build, your own boat with Plastic. (Fiberglas-Polyester). Catalog—10c. Gem-O'-Lite, Box 686H, North Hollywood, Calif.

TUB-Tite plastic caulking permanently seals and waterproofs boat seams. Tube $1.25 ppd. Kraney, 2440 Losantiville, Cincinnati 13, Ohio.

12 BODY-BUILDING COURSES, JIU JITSU & ATHLETIC EQUIPMENT

"POLICE Jiu Jitsu" complete, illustrated: $1 postpaid. Satisfaction or money back. Books Publishing Co., 56-G W. 24th St., New York 10.

MILITARY—Police Jiu-Jitsu, 50c! Scientific Boxing, 50c! Hirsch, Spring Valley 3, New York.

GAIN Weight! 4 exercises will increase weight. Complete $1.00. Body Builders, 36 Nevada Street, Winthrop 52, Mass.

BARBELLS, Dumbbells, Exercise equipment. Courses. Free booklet. Good Barbell Co., Reading, Penna.

14 FIELD GLASSES, TELESCOPES

AMAZING prices, brand new precision binoculars. $16.00 up. Free trial. Folder "Binocular Selecting," pricelist free. Prentiss Importers, Mercury Bldg., West Los Angeles 25, Calif.

POWERFUL astronomical telescopes easily made. Perfect lenses and instructions; 100x $3.00; 100x and 200x $4.00; 100x, 200x and 400x $6.00. Full power, clear vision guaranteed. Instructions alone 10c. Suffolk Science Service, Riverhead, N. Y.

POWERFUL telescope easily made. Perfect lenses, erector and instructions for making 40, 100, 200 and 400 power telescope $6.00. Telescopic Camera Co., Manorville 5, New York.

WAR Surplus Bargains. Binoculars, Telescopes, Sextants, Millions of Lenses, Prisms, Reticles, Eyepieces, Objectives, etc. Mail 10c for Big "Catalog CN." Send $1.00 for Stock CN-10-piece Lens Kit and Big Instruction Booklet. Edmund Scientific Corp., Barrington, New Jersey.

SAVE! Free 24-page, 3 color binocular catalog, 60 different models. United Binoculars, A-6516, 9043 S. Western, Chicago 20. Display Rooms Open Mon. thru Fri. 9:00-3:30.

SAVE 50% On New Binoculars! Free Catalog. Free book, "How to Select Binoculars." Write today. Bushnell's, 43-P37 Green, Pasadena 1, California.

BIGGER and better telescope kits with metal parts direct from manufacturer. Free Bulletins. Esco Products, 911 Willow Ave., Hoboken, New Jersey.

BINOCULARS, telescopes, microscopes. Our 20th year of leadership in optical values. Bargain catalog free. Brownscope Co., 24 West 45th St., New York.

"FREE" Catalogue! Thousand war surplus optical bargains. Lenses, Prisms, Telescopes, Binoculars, etc. Send $1.00 for 10 Lens Hobbyist Set and Project booklet. G. Jaegers, 691 West Merrick Road, Lynbrook, New York.

TERRIFIC Values. Binoculars, Telescopes, Microscopes $3.95 up. Request Free Money saving Catalog. Criterion, Hartford, Conn. Dept. S4.

REFLECTING Telescopes, completely assembled, 60X, $29.75. Guaranteed Observatory clearness. Free information. Skyscope, 475 Fifth Avenue, New York 17.

BUILD a 100X, 45X Astronomical Telescope that converts to a 45X Terrestrial Telescope! Inexhaustible source for thrills! 3 perfect ground and polished lenses; complete instructions for easy building. Money back guarantee, $3.00. Lemar Scientific Corp., Dept. E-73, 3412 W. Jackson Blvd., Chicago 24, Ill.

BINOCULARS, telescopes, astronomical telescope kits. Amazing values. Free literature. Write today! R & E Sales, Box 352, Worcester 1, Mass.

ERECTOR converts any astronomical telescope to terrestrial telescope. $2.00. Telescopic Camera Co., Manorville 5, N. Y.

GIANT, 100 power astronomical telescope with 6 ft. tripod (10,000 area magnification) Clear Vision full power guaranteed. $15.00 F. O. B. factory. Suffolk Science Services, Dept. TC, Riverhead, N. Y.

15 SPORTING GOODS, GUNS, FISHING TACKLE, ARCHERY, TRAPPING

120 PROFUSELY illustrated pages, antique pistols, swords, daggers, armor, etc. 50c. Robert Abels, PS860 Lexington Ave., New York 21.

SAVE on Gunsmithing, Jap Conversions, Scopes, Loading Tools. Catalog 10c. Cougar Arms Company, 587 Ferris Street, NW, Grand Rapids, Michigan.

FOREIGN Ammunition, Knives, Crossbows, Rifles. Catalog 10c. Ashton, 1511 Gardner, Hollywood 48, Calif.

HANDY Andy Golf Ball Retriever. Tremendous money saver. $2.00 Pat. Pend. Adi. 297 Clinton Pl., Hackensack, N. J.

5,000 BARGAINS, firearms, binoculars, war relics, catalog 50c. Smith Museum, Runnemede, N. J.

OVER 500 guns, modern, obsolete. List 10c coin. Ed Howe, 26 Main, Coopers Mills, Maine.

16 CAMPING EQUIPMENT & TENTS

TENTS, canvas; direct from manufacturer. Also war surplus Camping equipment, sleeping bags. Tremendous selections. Free catalogue. Low prices. Morsan Sales, Dept. PS-5, 10-15G 50th Avenue, Long Island City 1, New York.

FOLDING camp stool kit seasoned hardwood precision milled to size, no drilling, no tapping necessary, all hardware included. Comfortable wood seat wears like iron. Sturdy as a rock, carries stores easily, light weight, fun to build. Postpaid $4.85. Laconia Industries, Inc., 1707 E. Roosevelt, Stockton, Calif.

17 DOGS, BIRDS, HAMSTERS, RABBITS & PETS

EARN Up To $400 Monthly Raising Angora or New Zealand Rabbits. Plenty markets. Particulars free. White's Rabbitry, Newark, Ohio.

MAKE Big Money! Raise Chinchilla Rabbits. Cash Markets Supplied. Write Today! Rockhill Ranch, Sellersville 16, Pa.

PEDIGREED New Zealand white rabbits. Get the best, write Miller's Rabbitry, Port Jefferson, New York.

GOLDEN Hamsters. Bear strain. Pedigree stock. Breeders, laboratory or pet stock. Shipped express anywhere. Price list free. Charles E. Bowser, Smoke Run, Penna.

BIG Profits—Raise Guinea Pigs. Free Booklet. Taylors, B426B, Hapeville, Ga.

RABBIT raising pays. Illustrated Literature Tells How. Old Mill Rabbit Farm, Elmhurst 4, Illinois.

LEADING Rabbit Farming Magazine. Year $1; Sample Dime. American Rabbit Journal, Warrenton 3, Missouri.

18 FROG RAISING

JUMBO Frog Raising Profitable Information 10c. Vol Brashears, Berryville, Ark.

19 FARMS, OTHER REAL ESTATE

FARM Ranch Opportunities, favorable conditions. Washington, Minnesota, Montana, Idaho, Oregon, North Dakota. Literature, farm descriptions, specify which state. J. W. Haw, 120 Northern Pacific Railway, St. Paul, Minnesota.

STROUT'S Two Catalogs. Farms, Homes, Businesses. 3646 bargains 31 states. East and Mid-West Green cover; West Coast edition Yellow. Either Free. World's Largest. Strout Realty, 255-ZB 4th Ave., New York 10, New York.

FARM—Ranch—Hunt—Fish on Your Own Land in beautiful Calif., Oregon & Washington. Now available, several thousand choice acres from $10 to $25 per acre, full price, including 100% Oil & Mineral rights. Low, Easy Terms. Send only 10c (coin) for Full Details, Catalog, Photos. Pacific Lands, Box 2350BX, Hollywood 28, Calif.

FARM & Business Catalog Free! Big 1952 edition. Over 1000 Bargains from $1000 up. Maine to Florida, West's. G-7, Pittsburgh 17, Pennsylvania.

PROFITABLE Orchards, farms, homes, ranches, lands, stores, tourist courts, in beautiful, healthful, scenic, mild climate, coming Ozarks. Free literature, listed lists. Write, Barnsley, Clarksville, Arkansas.

BIG Free Summer Catalog! Farm and country real estate bargains, good pictures, many states, easy terms, many equipped businesses. For special service, state requirements, desired location. United Farm Agency, 2825 Main St., Kansas City 8, Mo.

BUY Virgin Ozark Lands—Timber—Minerals—Retirement—$5 Terms. Write Armstrong, Shook 42, Missouri.

20 TREES, SHRUBS, ROOTS, HERBS

CORSAGE Materials, Flower Arrangers' Supplies. House Plant Helps. Artificial Flower Parts. Free Catalog. Floral Art, Dept. PSJ, Teaneck, New Jersey.

21 POULTRY & SUPPLIES

RAISE pheasants on the $100 week plan. Little capital and space can make you independent. Free details. Great Central Game Management System, Columbus 6, Kansas.

22 PROFITABLE OCCUPATIONS

DETECTIVES Earn Big Money. Excellent opportunity. Detective Particulars free. Write, Wagoner, P-125 West 86th, New York 24.

MUSHROOMS Grown. Boxes, barrels, instructions 50c. Spawn $1.00. Manureless process $2.00. Gordens, 553 William, Winnipeg, Manitoba.

BE independent, be secure, have your own profitable business—earn $20.00 and more a day making beautiful, fast-selling lamps at home. No equipment needed. Illustrated course teaches you quickly. Course, parts catalog, wholesale price list —only $2. Gearon Co., Dept. 200-A7, 27 S. Desplaines, Chicago 6, Ill.

$40.00 WEEKLY. Made growing mushrooms. Fresh, Dried. Dominion Patent 331,583, free spawn. North American, 169Y Yonge, Toronto, Canada.

$5000 FROM half acre growing Ginseng, crop bought. Particulars 10c. Associated Growers, Sperling, Manitoba.

WANT A Diesel Job? New Opportunities to increase income. Higher Pay. More Money. We can help you Qualify. Tools. Shop method home training. Write today! Diesel, Tractor, Heavy Equipment Division, Interstate Training Service, Dept. 2G, Portland 13, Oregon.

PARRAKEETS—$2800 to $4000 profit each year easy with only 100 pairs of breeders. Big wholesale and retail demand. Write today for new illustrated book on care and breeding with complete plans for building your own equipment. Only $1.50 Postpaid Check or M. O. Cesco Enterprises, Dept. 3, Box 9305, Fort Worth, Texas.

"HOW to Make Money With Home Workshop" describes amazing methods used by hundreds of successful craftsmen. Tells what to make. How to sell workshop output spare time. Write at once for details. Craftsman, 115-B7 Worth Street, New York City.

PRINT Without A Printing Press. Big Money! See page 30.

$10,800 PROFITS! Your own Mailorder Business! No Capital Risk! "Success Plan" (worth $2) Free! Write today! Treasury, 149 Storer, New Rochelle F-1, New York.

RECOVER your own Piano Keys with Ivorine, simple, reasonable. Morgan Co., 6113 3rd Avenue, Minneapolis 19, Minn.

MEN, Women visit foreign countries on modern ships. Big pay, adventure, excitement. Experience unnecessary. Details Free. Davenport, 1170-B1 Broadway, New York 1, New York.

GROW Mushrooms, Boxes, Basements, Gardens, Lawns, Grasslands. Instructions 35c. Mushroom Spawn $2.14. New Manureless Process $2.50. Send for complete 3 item New Kit $4.99. No C.O.D. please. Guaranteed fresh spawn or your money refunded. Thomas Co., Dept. 82, 3604 30th Ave. S.W., Seattle, Wash.

FREE Book "505 Odd, Successful Businesses." Work home! Expect "Odd"! Pacific—37C, Oceanside, Calif.

START a buying service, buy wholesale thousands nationally advertised products. Make big profits selling at sizable discounts. Send postcard for details. American Buyers' Service, 631-S Linden, Buffalo, New York.

FREE Mailorder, Money Making, Homework Offers. Address, William Woodrow Jenkins, Lucasville, Ohio.

EXTRA Money. Spin Angora wool at home. Angora House, PSM, Springfield, Ill.

MONEY in Rabbits. Booklet for dime. Mohican, Box 68, Poquonock Bridge 2, Conn.

UPHOLSTERY—Instructions information $1.00. Upholstery Supply, Box 5066, Nashville, Tennessee.

GROW Mushrooms. Cellar, shed, and outdoors. Spare, full time, year round. We pay $3.50 Lb. We paid Babbitt $4,165 in few weeks. Free Book. Washington Mushroom Ind., Dept. 101, 2954 Admiral Way, Seattle, Wash.

23 BOOKS & MAGAZINES

MAGAZINES (back dated)—foreign, domestic, arts, Books, booklets, subscriptions, etc. Catalog 10c, (refunded). Cicerone's, 86-22 Northern Blvd., Jackson Heights, N. Y.

ADULT Books—Illustrated Comic Booklets. 10 for $1.00, 24 for $2.00. All Different. Free gift with each $2.00 order. V. M. Rogers, Dept. PS, Box 14738, Cimarron Station, Los Angeles 18, Calif.

FREE Catalog 400 popular books. Bargain prices. Books Publishing Co., 56 West 24th Street, New York 10.

DON'T get stuck! Protect yourself! Learn about rackets. 219 pages exposing numerous crooked schemes $1.00. Plains, Box 364, Amarillo, Texas.

CARTOON Booklets! Say fellows be the life of the party with these small illustrated booklets of comic characters. 10 different, $1.00. No postal C.O.D.'s. Reginald Sales, 210 LC Fifth Ave., New York 10, New York.

BOOKS for sale. Used. Out of print. Catalogue free. Balliol, Box 85, Station "K," Toronto, Canada.

BOOKHUNTERS! All Subjects. Send Wants! Jaher Book Service, 620-K East 178 Street, New York 57.

ADULT Book Bargains. Send Stamp. Vallon, 63 Perry, New York 14, N. Y.

BOOKHUNTERS! Scarce, unusual, miscellaneous books supplied. Atlantic Book Service, 2 Lawrence, Charlestown 29, Mass.

WHOLESALE Magazines to foreign countries. Arnold Klein, 183 Scholes, Brooklyn 6, New York.

MAKE Money at Home. 18 plans to choose, all proven successful. Big folder free. Maxted Book Agency, Western Springs, 12PS, Illinois.

BACK-Date magazines. Specific issues; years. Arkell's, Northridge, California.

FASCINATING Books. 24 Real Illustrated Humor Booklets $1.00. Foreign Art, Novelties. Illustrated Catalog 10c. Aladdin Book Co., 210-PS Fifth Avenue, New York 10.

NATIONAL Geographic Magazine 1888-1952. Any issue. Periodical Service, Box 465-PS, Wilmington, Delaware.

FREE Catalog. Self-Unfoldment Books. "The Mysteries," Yoga, Occultism, Mysticism, Philosophy, Freemasonry, Rosicrucianism, Theosophy. Jordan, 1130 Keller Avenue, Louisville 13, Kentucky.

ROUND and Square Dance instructions complete $1. P. O. Box 295, Fort Wayne, Ind.

24 GAMES & ENTERTAINMENT

"PIXIE Packets" for children 7-14. A different craft kit each month. Yearly subscription $5.00. Entertaining, educational, excellent gift. Write for free literature. Pixie Packets, Dept. S-1, 4909 Woolworth, Omaha 6, Nebraska.

25 MAGIC TRICKS, PUZZLES, ETC.

MAGICIANS! Gamblers' secrets exposed. Cards, Dice, Punchboards, Slot Machine. Catalog 10c. Book Co., Box 671, St. Louis 1, Mo.

"VENTRILLO" Professional Voice Thrower and Catalog 25c! Box 971-PS, Philadelphia.

GIGANTIC Fun Pack Free with Catalog 25c. "Funshop", 1220-A Filbert, Philadelphia.

LATEST Magic for pocket, parlor, stage. Catalogue 500 Tricks, only 10c. Unequalled magic service for 30 years. Douglas Magicland, Dept. 2, Dallas, Texas.

SENSATIONAL Magician's Wand. Vanishes Hankies. Disappears, etc., 25c with Catalog. 2352-N Fifteenth, Philadelphia.

DOLLAR Magic Set Free with Catalog 25c. Mysto, 4462-S Germantown, Philadelphia.

VENTRILOQUISM Self taught. Quick, easy instructions. 25c. "Ventriloquist", Cal Allen 3, Texas.

512-PAGE catalogue of 2500 tricks, pocket, parlor, stage. World's Finest Magic. Send $2.00 for catalogue (refunded first $8.00 order). Kanter's, S-1311 Walnut, Philadelphia 7.

BE a Magician. Large professional magic catalog of latest tricks. 35c. Ireland, F-109 North Dearborn, Chicago.

FREE trick and large illustrated catalog —35c. Lerro's Magic, 8111 Fifth Avenue, Brooklyn 9, N. Y.

MAGIC Monthly Year 25c. New 1952 Magic Catalogue 10c. New Joke Lists 5c. Magic Shop, Minneapolis 2, Minnesota.

26 COIN COLLECTING

GET Profit and Pleasure in collecting old coins. Send 10c for 56-page illustrated coin catalog. You'll be delighted with it. Send for it now. B. Max Mehl, 374 Mehl Building, Fort Worth, Texas. Largest rare coin establishment in U. S. Established 51 years.

OLD Money Wanted. Will pay Fifty Dollars for nickel of 1913 with Liberty Head (not Buffalo). We pay cash premiums for all rare coins. Send 4c for Large Coin Folder. May mean much profit to you. Numismatic Co., Dept. 30, Fort Worth, Tex.

SET nine Japanese invasion notes for U. S. $2.00. Illustrated coin catalogue 25c. Shultz, Salt Lake 10, Utah.

FREE! Foreign coin, banknote and Coin Collectors' Illustrated Catalog to approval service applicants. Send 3c postage. Tatham Coin Co., Springfield-50, Mass.

"COIN Collector's" greatest magazine, foreign money and wooden nickel 10c. Lawrence Brothers, Anamosa, Iowa.

28 STAMP COLLECTING

FREE! Powerful Magnifying Glass. Jamestown Stamp, Jamestown 202, N. Y.

FREE—Illustrated Catalog! Kenmore, Milford C-58, New Hampshire.

AMAZING Offer! 500 United States stamps—including commemoratives, airmails, high denominations to $5.00—Only 15c to Approval Applicants!! Illustrated Bargain Lists free. Mystic Stamp Co., Dept. 55, Camden, New York.

FREE—Complete set of Famous Americans, Flags, Parks and Presidentials to approval buyers. Send 3c for 15 of the above stamps plus full particulars. Triboro Stamp Company, 145 Nassau Street, Dept. 207, New York 28, N. Y.

300 STAMPS For Only 10c! This mammoth value includes Airmails, Pictorials; stamps from strange countries cataloguing up to 25c each!! Also approvals. Mystic Stamp Company, Camden 55, New York.

POLAR Bear Triangle: Giant George Washington Six Colored Ecuador, Arctic Triangle, first American commemorative, Corsica, Devils Island, others. Everything free with approvals. Capital Stamps, Little Rock 10, Ark.

1000 ITALIAN fine large pictorials $2.00. Beverini, Caselpostale, Ge-Pegli, Italy.

START your own Stamp Business. Send for Free circular. Donald Shepard, Box 1147, Chicago.

FREE Stamp "Circus" Giants, Pygmies, Kangaroos, Snakes, Rhinoceros, Ostriches, with approvals. Niagara Stamp Company, 27 Queensway, Niagara on the Lake, Can.

500 EXOTIC Japan Stamps—10c! Kenmore, Milford J-58, New Hampshire.

WE Give Away—Your Choice Latest Scotts Albums; Catalogue and available philatelic accessories. Realize—You Get These Worthwhile Rewards When You Buy From Our Better Foreign Approvals. Write Today For Full Particulars Sent With Trial Approval Selection. Americas' Stamp Service, Riverside 2, Calif.

FREE Stamp Collection:—100 different stamps from Europe, Africa, Asia, Scandinavia, Balkans, etc., 3c to approval applicants. Tatham Stamp Co., Springfield 50, Massachusetts.

FREE. Scott's International Album. Other big premiums. Full particulars with approvals. Raymax, 68-X Nassau St., New York 38.

"HOW To Recognize Rare Stamps." Free Book Illustrated! Kenmore, Milford H-58, New Hampshire.

WOW! 203 All Different Germany 10c! Zeppelins, Semipostals, Airmails, High Values, etc. to new customers. Jamestown Stamp, Jamestown 509, New York.

U. S. Army & Navy Heroes on Stamps; 10c with United States approvals. Locust, Box 305-A, Harmon-On-Hudson, N. Y.

200 DIFFERENT, including Roosevelt triangle, 5c to approval applicants. S. Avalon Stamp Co., Springfield, Mass.

FLAG Stamp—Free with hygrade U. S. approvals. Weniggman's, 1933 Patterson, Chicago 13.

77 DIFFERENT United States—25c. Approvals. Utechts, 1143-A North Keeler, Chicago 51.

1000 UNIQUE colorful attractive book mounted stamps 1c-2c each. Rushed. Niagara Stamp Company, 21 Queensway, Niagara on the Lake, Canada.

ALBUM! Holds over 1000 stamps! Only 10c! Stampmart, Hartford 1, Conn.

FREE Sample—Interesting Informative, Illustrated! National Stamp News, Anderson, South Carolina.

1000 FINEST world wide stamps, 500 varieties $2.00. William Anderson, Box 855P, Mountain Home, Tennessee.

FREE 55 foreign stamps to applicants for our approvals. Hoyt, Lowell Rd 1, Hudson, New Hampshire.

½—1—2c APPROVALS. Bargains Galore! Cole, 43G Rinewalt, Buffalo 21, N. Y.

50,000 STAMP Grabags 25c each. Anderson, 630a Bingaman, Reading, Pa.

PENNY approval bargains—write Department PSM, 1267 Tutwiler, Memphis 7, Tennessee.

ZANZIBAR Packet Free—Also includes stamps from Abyssinia—Cayman Islands—Ceylon—French Colonies—Gambia—Malta—Nigeria—and others. Send 5c for postage. Gray Stamp Company, Dept. PR, Toronto 5, Canada.

FREE Mint British Colonies from Tonga, Seychelles, Brunei, Transjordan, Sarawak, Solomon Islands, Caymans, Gilbert Ellice—Free with approvals. Viking, 130-P Clinton St., Brooklyn, New York.

FREE "Stamp Finder." Tells instantly country to which any stamp belongs. 32 pages profusely illustrated. Garcelon, Calais 18, Maine.

OLD scarce U. S. seconds on approval. Slightly defective, bargain prices. Hearnfield, Clintonhill Station, Newark 8, N. J.

PENNY Approvals by country. M. H. Hoerning, 102, Farmington, Ark.

YOURS! Three Liberia Triangles, Seychelles, Mauritius, Albania, Airmails, Africa, etc. Everything 10c with approvals. Rodman, 450 Locust Avenue, Burlington, N. J.

IS Your Hobby Too Expensive? Are high prices keeping your collection on the shelf? Try our 1c and 2c foreign approvals in books of 1,000 or U. S. at bargain prices. Clark, Box 544-U5, Muskegon, Mich.

YOU S-t-r-e-t-c-h Your Dollar when buying our mounted 1c and 2c foreign approvals. Also U. S. at bargain prices. Don't delay, write today. Roseland Stamp Co., Dept. 9-C, Spring Lake, Michigan.

FIVE Triangles free with approvals. Exotic Stampco, Box 2104, Miami 12, Fla.

100 DIFFERENT Spain 25c. Penny approvals included. Reed, Box 980, Chicago 90, Illinois.

MAGNIFICENT! Nineteenth Century U. S. Plus Civil And Spanish War Revenues. 20 Different 10c To Approval Applicants. AAA Stamp Company, Arcade Building, St. Louis 1, Missouri.

100 DIFFERENT U. S. 25c. Approvals. Buckeye, Box 53, Mansfield, Ohio.

40 DIFFERENT U. S. 10c. Pricelist free. Seidenberg, Appleton 944, Wisconsin.

1863 STAMPS given with approval purchases. References. Bacon, Huntsville, Mo.

TEN dandy sets. 10c. Approvals. Faszold, 423a Cameron, St. Louis Co. 15, Mo.

FREE Bahawalpur Jubilee set to approval applicants. Lighthouse, Box 1516, Colorado Springs, Colorado.

307 ALL Different—Only 15c! Beautiful collection: Commemoratives, Triangles, High Values, Bicolored Stamps, etc. Garcelon, Calais 418, Maine.

50 DIFFERENT Worldwide 3c! Approvals. Vinny Jo, Box 3062, Seattle 14, Wash.

APPROVALS ½c up from 33,000 collection. Chur, Box 245, Buffalo 12, New York.

FREE—"German War Issues" cataloging $10.82 to approval buyers. Royal Stamp Company, Tamaqua 2, Penna.

250 STAMP hinges and 10 different Argentina free with approvals. Jaydee, 218 West Dickinson, Grand Rapids 7, Mich.

GIANT Selection. Thousands different at 1c and 2c. Wahl's Stamp Exchange, 7008K Farragut, Chicago 31, Illinois.

FREE Collection—over 100 different stamps of world—commemoratives, animals, natives, ships, famous men, others all to approval buyers; also Scott Albums, Catalogs. Bell Stamp Service, Dept. W-3, Bell, California.

WONDERFUL Offer 7 complete mint sets Manchukuo, etc. only 10c with approvals. Reich Stamp Co., 4647 Kenmore, Chicago 40, Dept. S25.

NICARAGUA Sports, Costa Rica Agriculture sets 10c with approvals. Seminole Stamps, Box 1138, Coral Gables 34, Fla.

APPROVALS! Jumbo foreign selections, or low price U. S. Panthers Prompt Stamp Service, Dorchester 24, Mass.

100 DIFFERENT with approvals 10c. Jacobsen, 4395 Broadway, New York 33, N.Y.

1000 MIXED U. S. and foreign 25c. Monjar, Fairmount, Cincinnati 14, Ohio.

UNITED States stamps nearly 100 years old. Roosevelt set, others, 40c value—only 5c to applicants United States approvals. Wakonda, Box 272-H, Jackson Heights, N. Y.

FIRST U. S. (1847) Government Reissues 5c, 10c, plus Giant Bargain U. S. Collection—only 5c to applicants U. S. approvals. Metropolitan, Box 312K, Jackson Heights, N. Y.

30 MINERALS & PRECIOUS STONES

"GENUINE" red Arizona Rubies (Garnets). Send quarter for packet. Bitner's, Box 1025-C, Scottsdale, Arizona.

GEMS, Precious and semi-precious, genuine, from world-wide sources. Deal Direct, no overhead, save money. Catalog 10c. Hill Co., 5450-K Portland Rd., Salem, Ore.

GEMSTONES, Mineral specimens. Every variety. Lowest prices. Postcard brings free booklet. Plummer's, 4720 Point Loma Ave., San Diego 7, Calif.

CUT Beautiful gems. Easy. Profitable. Free list equipment—Rough Materials, Gems, Supplies, Books. O'Briens, 1116 Wilcox, Hollywood 38, California.

GEMCUTTING, Silvercraft authority. Illustrated magazine tells how. Cut rocks, make jewelry. 150 ads illustrating equipment, offering gems for collectors, cutters. Postal brings literature. Lapidary Journal, Drawer D, Palm Desert, Calif.

PANCHO Rock Hound, California, Mexican Minerals, Gems. Write to 818 Ft. Stockton Drive, San Diego 3, Calif.

31 HOBBIES, COLLECTIONS

INVENTING can be an interesting and profitable hobby. Write for complete particulars. Institute of American Inventors, Dept. 30-E, 631-E St., N. W., Washington 6, D.C.

33 ARMY patches, collar ornaments, Campaign ribbons plus introductory surprise, only $1.00; prices 10c. Hobbyguild, Box 71, Sta "A", Brooklyn, New York.

50 DIFFERENT army embroidered patches $1. Other bargains. Insignia Mart, 703B Broadway, N. Y. C. 3.

AMAZING—new fascinating hobby; collector's assortment of 57 authentic military insignia, ribbon bars, embroidered patches, naval rates; all branches armed forces—all for only $1. Extra gift Free with order! Pritt Co., 14 West 27th Street, New York City.

UNUSED matchbook covers—100 different $1.00—36 page Catalog 25c—Charles Edelman, 1311P East 84, Cleveland 3, Ohio.

32 PHOTO FINISHING, PHOTOCOPIES, ETC.

8 CONTACTS 30c, jumbos—40c. 12—45c. Jumbos—55c, reprints—4c, jumbos—5c. Free mailers. Western Photo PS72, Box 298, San Francisco 1, Calif.

OIL coloring photographs can be a fascinating hobby or profitable sideline for those with artistic talent. Learn at home. Easy simplified method. Send for free booklet. National Photo Coloring School, 835 Diversey Parkway, Dept. 1744, Chicago 14, Illinois.

YOUR eight exposure roll developed with three prints each good negative 50c. Two each 40c. One each 30c. Reprints 3c. A few cents postage appreciated. L. A. Eastman, Bode, Iowa.

8 OVERSIZE snapshots from roll, 25c with this ad. Snapshots, Box 8, Aurora 1, Ill.

SEND Now for Free Snapshot Magazine, mailers, offers. Houghton's, Athol, Mass.

TWO 8x10 enlargements 50c, five for $1.00 from your negatives. Wilart Enlargers, Box 967, Little Rock, Arkansas.

FILMS, highest quality, rapid service, eight enlarged prints, 50c. "Camera," Box 280, West Chester, Penna.

NEW—16 oversize contact prints or 8 jumbos in album, 25c with this ad. Album Studios, Dept. S, Weatherford, Oklahoma.

ROLL Developed and 4x6 or 3¼x4½ oversize glossy Velox prints, 8 exposure 40c, 12 exposure 60c, 16 exposure 80c. Clemet Photo Service, 1318 West Columbia Avenue, Philadelphia 22, Pa.

ENLARGE—2¼x3¼—2¼x2¼—35mm—negs. 5x7—25c; 2—45c; 3—60c; 8x10—40c; 2—75c; 3—$1.00. D. W. Paper, DePaul Labs, Box 6, Bronx 60, New York City.

JUMBO Album Prints, 8 Exposures $.40. 12—$.50. 16—$.60. Photoshop, Box 362, Ishpeming, Michigan.

33 MOTION PICTURES, SLIDES SOUND EQUIPMENT

GUARANTEED Fresh 8mm roll, magazine; 16mm roll, magazine movie film. Color, b&w. Free catalog. Eso-S, 47th Holly, Kansas City 2, Missouri.

8-16MM. Silent-sound films. Complete rental library. All latest subjects. Free catalogue. (sample film 10c). Garden Film, 317 West 50th, New York 19.

MOVIE Camera Film: 8mm roll $1.50. 16mm 100' $3.00. Free processing. Better Films, 742 New Lots, Brooklyn, N. Y.

SEE The World in gorgeous Ansco colors. Take a trip around the world. Packaged in sets of ten slides for $1.00. Slides and complete listings at your dealer. If not available write us. National Pictureslide Company, 134 W. 32nd Street, N. Y. C.

CLEARANCE Sale of 16mm Films. Want a real buy in 16mm Sound Films? Take advantage of the I.C.S. 1952 Clearance Sale of 16mm sound Features, Comedies, Cartoons, Novelties, Musicals.—new, used. Send for our giant list "A" today stating machine you own (make and model). Institutional Cinema Service, Inc., 1560-PS Broadway, New York 19, N. Y.

RENT 16MM sound films 50c reel. Large selection; free catalog. U. C. Film Service, 128 Chestnut St., Roselle Park, N. J.

DON'T buy a tape recorder before writing Dressner, 624 East 20th Street, New York 9, New York.

LEARN movie projection, management. Free catalog. Theatre School, Elmira, N. Y.

5,000 NEW-Used 8-16mm. Silent-Sound Films. International, 2120 Strauss, Brooklyn 12, New York.

"THE Entire Life Story of Christ" 8mm, 16mm, Sound & Silent. Rent or Purchase. Hemenway Film, 33 W. Melrose Street, Boston 16, Mass.

34 CAMERAS, PHOTO SUPPLIES

INSURED and guaranteed repairs at trade prices. Camera Repair Corp. of America, 225-C Broadway, New York 7.

KODAK Signet, never used, $68.47. Free Catalog 1001 bargains. Dealer's Mart, Dept. PS7, 11 Willard Ave., Mt. Vernon, New York.

BASS Says: Trading cameras a national habit since 1910. Write to Bass the old "Horse Trader." A postcard will do. Simply say: "Bass, I have and I want . . . How much will you allow me?" Satisfaction guaranteed. Bass Camera Company, Dept. AG, 179 W. Madison St., Chicago 2.

ADD "Spice" to home projection shows with colorful old-time Nickelodeon slides. 2x2. Write for Free list. Nickelodeon Co., New Fleidner Bldg., Portland 5, Oregon.

VIEW Cameras New, No lens, 5x7, $60.00; 4x5 with case, $98.50; National Graphic, used, $49.50. Other Bargains. Stiller's Stiller Bldg., Green Bay, Wisc.

BUY Photographic Supplies Wholesale. Films, cameras, projectors, enlargers, binoculars. Free Catalog. Capitol Photo Supplies, 2428 Guadalupe, Austin, Texas.

BRAND New 8MM Revere outfit . . . Camera, deluxe projector & case, screen, $139.50. A $50.00 saving. Free Catalog. 1001 bargains. Dealer's Mart, Dept. PS7A, 11 Willard Ave., Mt. Vernon, New York.

CANDID Wedding Photography. Complete course, $3.00. Harris Publishers, 402 W. 8th, Erie, Penna.

35 MUSIC, INSTRUMENTS & SONG WRITERS

WANTED! Poems for musical settings. Write Songwriters' Service, Clifton, N. J.

POEMS Wanted. Broadcast consideration. Sooner Song Co., 22 Northwest 8th, Oklahoma City 2.

POEMS Wanted for musical setting. Send poems for free examination. Five Star Music Masters, 646 Beacon Bldg., Boston, Mass.

POEMS Wanted to be set to music. Free examination. Send poems. McNeil, Master of Music, 510-PS, S. Alexandria, Los Angeles, California.

SONGS Wanted! New songwriters are writing hits each day! We teach you real songwriting the easiest, quickest way imaginable. Our amazing unique system requires no previous experience or special talent. Write for Free Booklet, "How to Write Music." No obligation. Meadowlark Music School, 108 Sumner Road, Colorado Springs, Colo.

ELECTRIC guitars, amplifiers, wholesale. Free catalog. Carvin, PS, Baldwin Park, Calif.

WRITE Songs? You must read "Songwriter's Review" magazine. 1650-PS Broadway, New York City. 25c Sample; $2 year.

PRE-Recorded high-fidelity tapes 32 reel list. Leroy Whitewater, Kansas.

POPULAR Songs. How to write and sell them. Write for free booklet Successful Songwriting. Gateway Songs, Box 2470, Hollywood 28, California.

YOUR Words and our music—a winning combination! Send poems. Free examination. Song Promotion Guild, 350-P Broadway, New York 13.

POPULAR used jukebox records—25c. List Free. Olin Milner, 32 Anderson Avenue, #7, Atlanta, Georgia.

SONGWRITERS! Send poems, songs. Music Service, 243 West 72nd St., PS, New York 23.

SENSATIONAL Free Booklet, "How To Write and Sell Songs." Get the facts first. Poems examined Free. Reliable Music Service, Box 430-B, Hollywood 28, Calif.

1952 ACCORDIONS—Wholesale. Free catalog. American Accordion Center, 5329 Belmont, Chicago.

SONGS Arranged. Poems set to music. E. Cole Ingle, 555 West Third, Mansfield, O.

36 RADIO, TELEVISION, SUPPLIES & EQUIPMENT

MAKE simple, tubeless, batteryless, distance-getting crystal radios. Crystal and illustrated instructions 25c postpaid. Allen, 427-S, Clinton, Mo.

BUILD 15 Radios—Only $1.30 Each. Experience Unnecessary. Home Radio & T.V Course, includes Trouble-Shooting and Servicing Lessons, Radio Principles, Code Instructions, Practical Radio Building and Repairs. You build and keep Receivers, Transmitters, Amplifiers, Test Equipment, Code Oscillator. All parts, tools, instructions supplied including Radio Tester and Electric Soldering Iron. Write for full particulars and receive absolutely Free your copy of "Radio & TV Repair Guide". No obligation. Progressive Electronics Co., 497 Union Ave., Dept. PS-20, Brooklyn 11, New York.

PASS FCC Amateur Radio Exams. Leads to profitable career. Simple, quick recorded, home study course for theory and code, lowest cost. Details free. American Electronics, Dept. PS, 1451 Wilkins Ave., New York City.

SUB-Miniature Pencil, Radio Superpowered mono-coil tuning. Less phones $3. Tel-Ray Electronics, 2153 East 28th Street, Brooklyn 29, New York.

MAKE minor repairs on any TV. Illustrated book shows picture troubles and remedy. One dollar. Francis, Box 5963, Cleveland, Ohio.

15 TESTED One-tube circuits 25c, including "Radiobuilder" catalog. Laboratories 1131-T Valota, Redwood City, Calif.

AMAZING electric eye. Unlimited uses. $3.50 postpaid. Instructions included. Springfield Enterprises, Box 54, Springfield Gardens 13, New York.

RADIO-and-electrical-research. Henry Twillmann, R. #1, Chesterfield, Missouri.

INFORMATION $1.00. 17 yrs. experience. Tubes 50¢. Free List. Television Radio, 25 N. Sarah St., St. Louis, Mo.

EVERYBODY'S set and tube tester, ten dollars. Free Literature. Stegotronics, Colchester, Conn.

SIMPLE radio television analyzer service sets make money $1.00 prepaid. Stegotronics, Colchester, Conn.

37 BUSINESS OPPORTUNITIES

GOOD Paying Business Silvering mirrors, plating autoparts, reflectors, bicycles, bathroom fixtures, etc., by late methods. No tanks or shop required, outfit furnished. Free Booklet. Gunmetal Co., Ave. E. Decatur, Illinois.

EXTRA Money—No Selling—operate vendors. Amazing profits, details Free. Silver King, Suite 221, 622 Diversey, Chicago 14.

OPERATE profitable mail order business. Write Walter Service, 4159-B East 112th, Cleveland 5, Ohio.

MAKE money addressing envelopes. Our instructions reveal how. Glen Glenway, 5713 Euclid, Cleveland 3, Ohio.

ENVELOPES addressed accurately, reasonably. Fast Service. We have capable addressers in your city. Glenway System, 5713-X Euclid, Cleveland 3, Ohio.

SELL by mail; free details; instructive booklet 25c. Manhattan House, Box 51-L, St. Albans 12, New York.

IMPORT-Export! Men-Women. Instructions from established World Trader shipped for no-risk examination. Opportunity profitable world-wide mail-order business from home without capital; or travel abroad. Experience unnecessary. Free details. Melinger, 1715-AR, Los Angeles 24.

HOW and where to obtain Capital? Free details. Star Service, Wapakoneta, Ohio.

$25 WEEKLY Working two hours daily. No canvassing. No manufacturing. Lycke, Box 2471-B, Cleveland 12, Ohio.

MAKE Money At Home as renewal headquarters for all magazines. Liberal commissions. No experience—No capital needed. Supplies furnished. Write for Free Catalog. McGregor Magazine Agency, Dept. 510B, Mount Morris, Ill.

RECAST old batteries into new. Latest achievements. Battery Laboratories, Minneapolis.

SELL your products by Radio! No risk! Pay commission. 400 nationwide broadcasters! Simon-C7, 48 Fifth Avenue, Pelham 65, New York.

LIQUID Molding rubber. $2.95 quart, $9.95 gallon prepaid! Plastercraft Supply Company, 3051 St. Clair Ave., Cleveland 14, Ohio.

MAKE $3.00 Hour At Home—I do—making sandals. George Youngs, 1308 South First, Arcadia, California.

WATERLESS Hand Cleaners Highly profitable home mfg. & route business. Simply add water to concentrates or ready-packed under your label. Dispensers at cost. Western G Aircraft, Los Angeles 19.

$5 AN Hr. & more possible in your home. You Can Paint It With Suede—Fabulous new business—spare or full time. Spray on rainbow colors—Auto dashboards and trunks—Signs—Radios—Toys—Figurines—Lamps—etc—beautified with amazing new 3rd dimensional plush-like finish with touch-appeal as well as eye-appeal. I'll send you complete, step-by-step plans and equipment, including high-velocity spray gun for no-risk examination in your own home. Send no money—just name and address. Coast, 1004-Z S. Los Angeles St., Los Angeles 15.

SEWING Machines. Big Money! Spare time. "Hang out your shingle" at home. Learn repair, electrify, trade, sell New machines, motors, cabinets, parts furnished. Free details. Taylor Service, Hamilton PS-7, Ohio.

START Mailorder Bookshop—Build your future. 25c brings booklet, samples, exciting ideas. General Publications, Ossining 1, New York.

OVER 700% profit making finished pictures in 2 minutes on the spot in daylight with new PDQ camera, without darkroom. No experience needed. Simple directions teach you quickly. Write PDQ Camera Co., 1161 N. Cleveland Ave., Dept. XPS, Chicago 10, Illinois.

ELECTRO Plating equipment—New and used. Complete assemblies. All sizes for all types of plating. Baby shoe metallizing sets. Mounts, supplies, instructions. Free catalog. Hollywood Bronze Supply, Dept. R, 1624 E. First Street, Los Angeles 33, Cal.

SEASHELLS for making Gifts, Novelties, Jewelry, handicrafts. Illustrated pricelist free. Instruction book of 155 designs $1. Gifthouse, Box 4550-PP, Coral Gables, Fla.

TO $35.00 Weekly. Spare time, home mailing work. Lynn, 10420-C National, Los Angeles 34, California.

MAKE Money spare or full time, casting Metal Toys and Novelties. Big wholesale and chain store demand for Autos, Soldiers, Ashtrays, Banks, etc. keeps manufacturers busy. Production moulds furnished for up to 100 and more castings per hour. No experience or special place necessary. Write for information and illustrations of patterns needed. Metal Cast Products Co., Dept. E, 1696 Boston Road, New York 60, N. Y.

NEW Products Wanted by N. Eng. sheet metal fabricator to make and/or market. Platt & LaBonia Co., North Haven, Conn.

YOUR own mail order business offers unlimited earning possibilities. Exciting details free. Smith Sales, Box 121S, Terre Haute, Indiana.

HOME work! Men! Women report $7.50 hour! Get these valuable free facts on this gorgeous piece Invisible Reweaving Occupation right now! Simplicity, 894 Main, Buffalo 2, New York.

WANTED! At Once! Home Producers by manufacturers in our Clearing House Service. Become a sub-contractor casting plastic products for these companies. Thousands of easy to make items required. Cash in at home, without previous experience. For details, write Plastic Service Guild, Dept. PS, East Boston 28, Massachusetts.

BIG Money and fun growing Live Miniature Ming Trees on your window sill. Write for Free rare tree seed and plan. National Nursery Gardens, 8463 South Van Ness, Inglewood 4, Calif.

BIG-Paying home mailorder business. Details free. Jackson, Newfoundland 7, Ky.

EARN $15,000-$30,000 annually. Franchise protected. Guaranteed minimum $12,500 or money back. Live at home. No merchandise to buy. Selfemployed. One of most exclusive and noncompetitive businesses in United States. Send 50c for explanatory book. Money refunded when book returned. Harrell & Company, Box A-2, Louisville, Illinois.

MAKE Rubber Stamps, repair dolls, learn invisible reweaving, repair sewing machines. Catalogue of "40 Ideas." Universal, Box 1076-B, Peoria, Ill.

LIQUID Rubber, make flexible molds. Free Sample. Chaney, 1130 E. 16th St., Jacksonville 6, Fla.

POPCORN and Potato Chips make respectable business. Long Eakins Company, 5263 High, Springfield 99, Ohio.

FIX Typewriters. Free booklet describes our modern, inexpensive home-study course. Factory methods taught. Write: Typewriter Building 4, Tarentum, Penn.

TRADE Magazines Help You to success. Get latest copies through our Easy-To-Get-Acquainted Service. Hundreds of business, professional, advertising, agricultural, construction, educational, engineering, electrical, health, laundry, legal, lumber, machinery, mail order, marine, metal, military, milk, milling, motion picture and others covering All interests. Send for List today. It's Free. Commercial Engraving Publishing Company, 348 North Ritter, Indianapolis 19, Indiana.

MAKE Money at home—mailing literature—running Ads. Pleasant and profitable. Write Miller, 1772-R Carlyon Road, East Cleveland 12, Ohio.

BUSINESS Of Your Own. Full or part time. No investment or previous training required. Opportunity unlimited. Write today. Scientific Electric Co., Box 2162pc, Cleveland 8, Ohio.

MAKE flexible molds! Cast plaques, bookends, figurines! Free sample! H. Tooker, 630-A Chestnut, Hamilton, Ohio.

SMALL investment in Artkote molds, puts you in $5.00 hour stone facing business. Sample mold $2.00. Dividend Company, Liverpool 2, New York.

MAKE Perfumes At Home. Write, "Carey Laboratories," 1914 Chouteau, PS-7, St. Louis 3, Missouri.

INCOME from local information. No selling. Write—Neherco, La Verne 6, Calif.

FREE illustrated course casting novelties genuine latex for molds. Major Chemical and Latex Co., 25 Allerton Street, Boston 19, Mass.

HOME Business opportunity mailing literature to new mothers. Everything furnished. Big earnings. Orders filled. Delray, Box 3852S, Columbus 13, Ohio.

MAKE Perfume—Everything supplied—no equipment needed. Sample fragrance, details Free. Genmerco, Box 142-PS, Dorchester 24, Mass.

"MAKE Perfume" Profitable Mailorder business—Catalogue Free. "International," 6347 Parnell—PS-7, Chicago 21, Ill.

HAVE Home Mail Business! Success Assured by helpful Idea-Mailbox Service. Booklet 25c. Details free. N.M.D. Agency, Box 88-S, Dorchester 22, Mass.

FREE Folder—100 Ways to Make Money in Silk Screen Printing. National, Box 88-PS, Dorchester 22, Mass.

OPERATE "Escolator" Mailorder system, selling our products or any products. Fastest, most revolutionary mailorder system known. Write: Selbyco, Decatur 170, Ill.

MONEY-Making Opportunities—3c stamp. Levy, 4019 Dumaine, New Orleans, Louisiana.

SPARE time business! Sell colorful Decalcomania Home Decorations for kitchens, bath, nurseries, gifts, etc. Friends, neighbors buy on sight. Millions sold every year. Start earning real money now. Up to 100% profit. Send postcard for sales plan plus test assortment on approval. Send no money. Decal Art Co., Dept. PS-7, 344 N. Lorel, Chicago 44, Illinois.

NATURAL Molding Latex. Extra thick. Free sample. W. Wooley, 115B Donald, Peoria, Illinois.

SCRAP materials make unusual home business! Complete Copyrighted instructions 30c. Cord-Card, Box 204, Lenox Hill Station, New York 21.

SAWDUST. Turn it into cash. Twenty methods. Instructions 50c. Charles Company, 12-EAF, Norwood, Ohio.

MONEY in new greaseless doughnuts. Start in kitchen. No smoke. Sell stores. Free recipes. S. Ray Co., 3605 South 15 Ave., Minneapolis 7, Minn.

BUY Wholesale thousands nationally advertised products at big discount. Sent free "The Wholesale Plan." American Buyers' Service, 628-S Linden, Buffalo, N. Y.

NATIONALLY known corporation will buy outright or finance and promote sale on royalty basis of any desirable new device, formula, preparation, cosmetic or invention. Write to President, 10 E Coulter Street, Phila. 44, Pa.

INFORMATION, any subject $1.00. P. J. Brady, Aberdeen, South Dakota.

$250 WEEK reported! Free book "505 Odd, Successful Businesses." Work home! Expect something Odd! Pacific-36C Oceanside, California.

EARN Money At Home With Your Typewriter! Spare time! Details free. Edwards, Publisher, 3915-PS, 12th, Des Moines 13, Ia.

URANIUM enterprise possessing unlimited potentialities requires several associates to participate in development of this "world's most sought for" material. Write Johnston, Box 142-C North Battleford, Saskatchewan, Canada.

START Business without Capital! Reliance, 15-B Park Row, New York 38, N. Y.

MEN-Women—"Everybody Likes Candy." Learn to make professionally at home. Tools and supplies. (Our 42nd year.) Ragsdale Candies, East Orange, N. J.

MAIL Selling opportunities galore! Free details! Instructive folio 25c. Wehner, Box 142-E, Roxbury 19, Mass.

BUY it wholesale. Manufacturers, Distributors. Over 850,000 items. Literature free. Olsen, 1231-B East Third St., Duluth 5, Minnesota.

HOME Work. Addressing Cards for National Advertisers. Free Details. Janosik Service, 5527-X South Sangamon, Chicago 21.

ADDRESS our postcards. Send stamped envelope for reply. Wilson Mail Service, 1987 Studer Avenue, Columbus 7, Ohio.

FEW dollars starts profitable home businesses; 50 kinds; local; mail order; details free. Natmerch, Box 1975-BG, Little Rock, Arkansas.

FIGURINES unpainted, free illustrated list. Haverty Products, 822-A 17th Street, Altoona, Penna.

INCREDIBLE! Become mental superman overnight! Free Booklet! Bijou, Box 1727-TTV, Hollywood 28, Calif.

OPERATE profitable collection agency business. Free circular. Financial, B-740-P, Chicago 90.

HOMEWORK—easy—profitable. Rush name. Siegel, Box 183-PS, New York 2.

EARN money at home! Thousands do! "Home Worker Magazine" tells how. Sample, 25c. Sizemore, Box 6, 4917 Kostner, Chicago 30, Ill.

COLORGLAZED Concrete Pottery made without molds. Patented method. Cemetery products, novelties, tiles. Basement leak-sealing. Money-making projects. Booklet, details free. Men only. National Potteries, Grand Rapids, "Minnesota."

OPERATE Employment Agency from home or office. Unlimited possibilities. Free details. Gordon Publishers, Box 23, Pawtucket, R. I.

RUBBER Molds! New catalog illustrating over 100 professional molds. 10c. Castcraft Studios, 508-PS Marion St., Brooklyn 33, N. Y.

ELECTROPLATE Metals, Mirrors, Non-Metals. Profitable home business. Portable Tyco Electro-Plater $5.95, including plating salts, formulas, electroplating manual. Tyco Metals, Box 13231-CJ, Houston 19, Tex.

$46 FROM Square Foot Plywood; Jigsaw necessary. Write: Woodart, Bridgewater, Massachusetts.

MEN-Women! There's Big Money in making Novelties spare or full time at home and we can prove it. Absolutely no previous Experience necessary. We supply names of interested buyers for your finished products. Also valuable information about Liquid Marble. Write for Free Catalog—"There's Money in Plastics" today! Write: Bing Products, PS-752, Watertown 72, Mass.

THROWN Away! Tons of ground rubber by tire recappers. Make it into Plastic Rubber of 1,000 uses. Easy! Inexpensive! Start profitable business! Instructions with samples $1.00. Ceeten Products, 242-T, Crozet, Va.

38 MONEYMAKING OPPORTUNITIES

21 POPCORN, Candy Apple Formulas, proven money-makers. Send $1 today for formulas, catalog of money-making ideas. Concession Supply, 3916 Secor, Toledo, O.

DETECTIVES Earn Big Money. Experience unnecessary. Detective Particulars free. Wagoner, P-125 West 86th, N. Y. 24.

SPARETIME Profits Taking Subscriptions All Magazines. Wholesale Catalog Free. Cassell Publishers, Westfield 1, N. J.

ADJUSTERS Needed Now! Excellent high pay positions open with airlines, insurance companies and government departments. Qualify now. Write today. Universal Schools, P-127, Box 8202, Dallas 5, Texas.

BE Appointed State Notary Public Now! Details; Stationers, Helotes, Texas.

HOW to get your mail order advertising Free revealed by famous expert. Also other "Inside" secrets. Free details. Benson Barrett, 1751-B Morse, Chicago 26.

BE Self Employed—Details—Boyen, 51-56 48th Street, Woodside 77, New York.

LEARN Watch-Clock Repairing at Home. While learning we fix all watches for you. Simplified technical books on all subjects of everyday usefulness: $1 each. Inquire. Modern Technical Supply Co., 55-PM West 42nd Street, New York 36.

PRINT Without A Printing Press. Big Money! See page 30.

$10,800 PROFITS! Your own Mailorder Business! No Capital Risk! "Success Plan" (worth $2) Free! Write today! Treasury, 149 Storer, New Rochelle PS-1, New York.

UNPAINTED Plaques, Bookends, Novelties, Stamp brings list. Umlauf, 239 So. Luther, Detroit 25, Michigan.

MAKE Money—Sewing and Assembling at Home. Liebig Industries, Beaver Dam 7, Wisconsin.

OPERATE profitable mailorder business, write Jpsco, 2623 Columbus, New Orleans 19, Louisiana.

SALESMEN—$100.00 more weekly by using "Secret" on present job. Brennan, 4025-A Lankershim, North Hollywood, Cal.

FREE formulas and instructions for making newest big profit perfume specialties from tap water. Write today. De Casto of Hollywood, 1535 N. Hudson, Hollywood 28, California, IM3.

$100-$200 WEEKENDS no selling or manufacturing. Brennan, 4025-Y Lankershim, North Hollywood, Calif.

SELL Titania Gems $9.75 Carat. Wholesale. More brilliant than diamonds. Free catalogue. Diamonite, 1404S Mitchell, Oakland 7, Calif.

MANUFACTURE Rhinestone and Pearl Jewelry at home. Latest creations, tremendous profits, no skill needed. Postcard brings illustrated catalog of settings, stones, etc. A. V. Cutt Co., Inc., 210-H Fifth Ave., New York 10, New York.

EARN Money Evenings, copying and duplicating comic cartoons for advertisers. Adservice, Argyle 2, Wisconsin.

MAKE tremendous profits with fast-selling Costume Jewelry! Buy Direct! Sell your friends, neighbors and customers at big savings to them! Write for our Free Catalog! Penn Jewelry, Dept. 17, 826 W. Lacka., Scranton, Pa.

GROW Dwarfed Trees! Instructions, 25c. Levy, 4019 Dumaine, New Orleans, La.

595 MONEY making secrets. Send stamp. Book Service, P. O. Box 453, Port Chester, New York.

FREE Book "505 Odd, Successful Businesses." Work Home! Expect something Odd! Pacific-35C, Oceanside, Calif.

BUY Wholesale thousands nationally advertised products at big discount. Sent free "The Wholesale Plan." American Buyers' Service, 627-S Linden, Buffalo, N. Y.

$40.00 WEEKLY. Spare Time. Home Mail Order System. "Beginner's Successful Plan." Free. Peerless Products, Phoenixville, Pennsylvania.

BIG money in key making! Small investment puts you in business. Complete locksmith set-up, including key machine, key blanks, necessary tools and instruction books for as little as $94.50. Many others. Free catalog. Write today! Hugo Solomon & Son, 70 East Warren, Detroit 1, Michigan.

$$$ IN Personalized Baby Record Books. Sell By Mail Use Same Literature We Do. No-Co-Ro, Oakland 6-P, Calif.

39 FORMULAS, PLANS, ETC.

FORMULAS—All kinds. Latest products. Literature free. Kemico, Park Ridge 15, Ill.

SIMPLIFIED Range Finder, plans $1.00. Kivco, 4037 Windsor, Pittsburgh, Penna.

BOOK—10,000 Formulas, Processes, $3.98 Postpaid. Free literature. Kenneth Paullin, Loudonville, Ohio.

LABORATORY tested formulas. Lists free. Pont, Box 635-PS, Terre Haute, Ind.

FREE Formula Catalog anything analyzed $25. Western Chemical, Salem, Ore.

40 PLASTICS

LUCITE, Plexiglas. Any size sheets masked. Square foot (12 x 12) cost 1/16" $1.20; ⅛", $1.40; 3/16", $1.75; ¼", $2.08. Include 10% postage. Almac Plastics, 230 Fifth Avenue, New York 1, New York.

PLASTIC Sheets, Rods, Tubes, etc. Free List. Plastic Supply Co., 2901 N. Grand Blvd., St. Louis 7, Mo.

NEW carving manual, material catalog, 50c postpaid. Plastic's, Box 1812, Salt Lake City 10, Utah.

NEW liquid casting plastic. Clear, colors. Embed flowers, insects, coins. Saw, drill, carve. Send 25c for Wholesale Catalog and New Sales Manual showing how to make money at home. Castolite, Dept. H-102, Woodstock, Illinois.

PLASTICS, everything. Retail-wholesale prices. Catalog—10c. Gem-O'-Lite, Box 686K, North Hollywood, Calif.

MANUFACTURERS of a complete line of internal carvings. Special introductory offer: $1.00, jewelry set and keychain. Crystal Floral Company, Bound Brook, N. J.

41 CHEMICALS & APPARATUS

LUMINOUS Paints will glow in dark. Six colors. Fairmount Chemical Co., 136 Liberty St., New York City 6.

NEW Idea Chemical and Apparatus Outfits for Home Experimenting, Photo-Scales, Microscopes, Chemicals, Biological and Laboratory Supplies in Small Quantities. Catalog 25c. Established 1931. John H. Winn, 124-B West 23rd Street, New York 11, N. Y.

BRAND New, spectacular chemical and fireworks experiments manual. Complete set-ups and instructions $1.00. Chemi-Technix Laboratories, 568 Riley Street, Buffalo 8, New York.

ILLUSTRATED Catalog: Chemistry, mineralogy, biology, 10c. Tracey Laboratories, Evanston, Illinois.

CHEMICALS and apparatus for industrial, analytical, and private laboratories. Catalog 20c. Dept. M-26, Biological Supply Co., 1176 Mt. Hope Ave., Rochester 20, N. Y.

SPECTROSCOPE for quick chemical analysis $3.00. Cutting Sons, Los Altos, Calif.

AMAZING New Book of Science, Experiments, Formulas and catalogue of Laboratory Supplies. Only 25c; National Scientific Co., Dept. 15, 2204 W. North Ave., Chicago 47, Illinois.

42 HELP WANTED

FOREIGN & Latin American Employment 1952. "Foreign Service Directory" gives Up-To-Minute Facts on Military & Civilian Construction, Government Jobs, Major Oil Listings, Aviation, Transportation, Steamship Lines, Mining, Importers, Exporters. How-When-Where to apply, application forms. Hot List Firms Hiring. $1.00 post-paid. Global Reports, P.O. Box 883-S, Hollywood 28, Calif.

FOREIGN Employment. Construction men, building trades, helpers, office men, others interested in Foreign Projects. High wages, quarters, transportation. Send $1 for Foreign Construction Compendium and Application Forms. Foreign Service Bureau, Dept. PS-7, Metuchen, New Jersey. (Not an employment Agency—no fees.)

MAKE Money. Addressing and mailing post cards. Write—Ernest Martin, Lawson Street, Martinsville, Virginia. Addressed envelope appreciated.

SAIL Ho! Be a merchant seaman. Men 16-55. No experience necessary. Enjoy world-wide travel and romance plus big pay. All information and entrance instructions in "Seafarer's Guide." Limited edition. Only $2.10. Now is your opportunity. Don't delay. Seaways, P. O. Box 1231, Baltimore 3, Md.

$1,000,000 CONSTRUCTION Projects. "World Wide" printed Monthly Foreign & Domestic employment. Free application blanks tells How-When-Where to apply. $1.00 complete. Global Reports, P.O. Box 883-PX, Hollywood 28, California.

FOREIGN Jobs. Contracts underway and soon starting in Africa, South America, Canada, England, Europe, South Pacific, Middle East, Mexico and Alaska. Send $1.00 for foreign job news, information, application forms, etc. DCS Foreign Job News, Dept. 268-DN, Bridgeport, Ill.

ANCHORAGE, Alaska. Help Wanted, construction, wage, rental information air mailed $1.00. Weyand, 1501 11th Avenue, Anchorage, Alaska.

BOOKKEEPERS earn $100.00 weekly operating simplified Bookkeeping-Tax Service. Details free. Universal, Box 664-P, Springfield, Missouri.

THOUSANDS skilled, unskilled jobs available. Free training for women. Los Angeles and San Diego wantads and information airmailed. Send $1.00 to Lake Fait, San Diego 12, Calif.

ALASKA—Last American Frontier. $1.00 brings 1952 Business Directory, Government Map, Construction Projects Military & Civilian, Homestead & Highway facts, Hunting-Fishing-Game Rules, Mining, Aviation. List of firms hiring. How-When-Where to apply. Alaska Opportunist, P. O. Box 883-S, Hollywood 28, California.

CONSTRUCTION Workers. Want to make better jobs? Longer jobs? Latest information. Jobs breaking. Jobs underway. North, South, East, West. The best. Big job list. Accurate. Up to date. Send one dollar. Dempster's Construction Scout News, Dept. 268-DM, Bridgeport, Illinois.

43 AGENTS WANTED

NEW Jobs open in selling! Send name, address for five free issues of Opportunity Magazine's money-making guide, listing hundreds of companies who'll pay you well, full or part-time. No experience needed. Opportunity, 28 E. Jackson, Dept. 18, Chicago 4, Illinois.

MAKE Wedding Profits. Sell invitations, napkins, matches. Samples free. Dunbar's, Middlebush 5, N. J.

WANT to make real money? You can positively make $50.00 a day and up selling a brand new item going to every type of Food and Beverage Store, Factories, Laboratories, Hospitals, etc. First time advertised. Samples furnished. Utility Durawear, 53 West Jackson Blvd., Dept. PS-7, Chicago 4, Illinois.

AGENTS—300% profit selling genuine gold window letters: stores and offices. Free samples. Metallic Sign Letter Co., 431-E North Clark, Chicago.

BE A Money Maker . . . Use your home as magazine headquarters. Liberal commissions. No experience—No capital needed. Everything furnished. Write for Free Catalog. McGregor Magazine Agency, Dept. 510A, Mount Morris, Illinois.

PRINTING — Salesbooks — Envelopes. Free Illustrated Catalog—Ersco, Dept. S, Bronx 72, New York.

NEED Extra Cash? Take orders for personal initialed belts and buckles, cap badges, tie holders, etc. Choice of 3000 emblems. Free sales kit. Hook-Fast, Dept. 1425PS, Providence, R. I.

AMAZING Miracle Auto Polish—Plastone! New scientific discovery contains pure Carnauba Wax. Genuine Plastic plus Silicones! Sensational money maker! Nationally advertised! Sold by leading firms. Used by America's largest organizations. Only $1 retail 100% profits. Sales experience unnecessary. Exceptionally easy sales. High repeat sales. Choice protected territories. Once in a life time opportunity for large steady earnings. Only limited number of agents accepted. Write Today. Plastone Company, 2950 W. Grand, Dept. PS-7, Chicago 12, Illinois.

AMAZING but true! We pay you daily cash for giving women privilege wearing wonderful nylon stockings at our risk. These beautiful sheer nylons cost nothing unless satisfactory! Yet, you get advance cash plus huge bonus that increases your earnings by 40%. Postcard brings you free sample stocking and complete money-making outfit. No obligation. Kendex, Babylon 14, New York.

GOLD Lacquered and silver sign letters. Windows, doors, trucks. Standard Sizes. Penny and up. Samples. Atlas G, 544 West 79th, Chicago 20.

START Your Own Business on credit. Your own boss. 1586 of our Dealers sold $5,000 to $27,500 in 1951. We supply stocks, equipment on credit. 200 home necessities. Sales experience unnecessary. Pleasant, profitable business backed by world-wide industry. Write Rawleighs, Dept. G-U-PSC, Freeport, Ill.

MAKE Extra Money—for yourself, club or church. Up to 100% profit selling big value Christmas, All-Occasion greeting card assortments to friends, others. 7 leading 21 card $1.00 boxes, Religious and Novel cards, Gift Wrappings, Ribbons, Stationery, Napkins, Animated Books, Sewing Kits, unusual gifts. Over 150 items. Bonus plan. Experience unnecessary. Write for samples on approval. Special Offers. Hedenkamp, 361 Broadway, Dept. PS-19, New York.

JUST Out! New Thrilling Sensation in Christmas Cards. Make Big Money! Show Lustre Foils, Satins, Brilliants. Amazing Values bring Easy Orders! Magic Glo-In-The-Dark Ornaments, Personalized Stationery, Matches, 30 Free Samples. With Name 50 for $1.25. Several $1.00 Boxes on Approval. Joy Greetings, 507 N. Cardinal, Dept. 61-A, St. Louis, Mo.

FREE Book where to buy 800,000 articles from manufacturers at Wholesale Prices. Save up to 50% on Nationally Advertised Merchandise. Rush name for Free copy. Glass Pub. Co., Ellwood City 1, Penna.

PHOTO-Salesmen-Agents. Sell beautiful hand colored plastic enlargements and sensational new photo compacts, rings, bracelets, lockets, etc. Collect deposit, we deliver. Profitable sideline. Send card for Free sample kit. Novel Portrait Co., 3343-A North Ave., Chicago, Ill.

MAKE big money—season starting—sell 1953 calendars advertising specialties and executive gift line. Experience unnecessary. Commissions advanced. Outfit Free. North American Calendar, 605-AB Washington, Chicago 6.

MAKE Money Introducing World's cutest children's dresses. Big selection adorable styles. Low prices. Complete display free. Rush name Harford, Dept. H-1341, Cincinnati 25, Ohio.

BIG Daily Profits. Free Sales Kit. Sell personal initialed buckles with belts, cap badges, tie clasps, etc. Choose from 3000 emblems. Hook-Fast, Box 480PS, Roanoke, Va.

CASH in on your spare time! Sell beautiful new Regal Christmas Greeting Cards and Gift Assortments. No experience necessary. Costs nothing to get started. Show wonderful samples to friends, relatives, neighbors. Merely take orders and pocket up to 100% profit. Write today for samples on approval. Regal Greetings, Dept. 26, Ferndale, Michigan.

CASH—For Yourself Or Your Organization—Quick, Easy Pleasant, No Experience Necessary. Spare time, full time, it's the sure way to make money. Everybody buys exclusive, exquisite new 1952 Elmira Christmas line-DeLuxe Christmas Assortments, 5 Name Imprinted Christmas Card Lines, all-occasion Cards, gift wrappings, gift items, books, personalized stationery, napkins, matches from $1.00 up. High quality, Low cost, Save friends, neighbors, co-workers time and money. Start making extra cash at once—with no investment. We supply everything—Free Samples, money-making kit, Bonus, Money-Saving Offers, assortments On Approval. 42 page catalog. Promptest Service ensures recommendation to others. Write today. Elmira Greeting Card Company, Elmira C-113, New York.

ABSOLUTELY Free! Big package actual sample fabrics and style presentation of dresses, lingerie, hosiery, etc. Take orders. Commission big. Send no money. Melville Co., Dept. 7434, Cincinnati 25, Ohio.

AT Last! Something New and Sensational in Christmas Cards. Make Extra Money Fast! Show Satins, Velours, Metallics. Gets Easy Orders. Pays up to 100% Cash Profit. 30 Free Samples. With Name 50 for $1.25. Big Line. Amazing new Glo-In-The-Dark Ornaments. Personalized Matches, Stationery. Several $1.00 Boxes on Approval. Euro Greetings, 2801 Locust, Dept. 241-J, St. Louis, Mo.

LADIES Princess Garters comfort beauty hose last longer 50c. 3 pair $1.00. Excelsior Products, 11000 E. McNichols, Detroit 34, Michigan.

VITAMINS! Get yours Free! Make extra money! Send postcard. Vim Vite, 2910Y Beverly Blvd., Los Angeles 4, California.

DO You Need Money? $35.00 is yours for selling only 50 boxes of our 300 Christmas Card line. This can be done in a single day. Free samples. Other leading boxes on approval. Many surprise items. Experience unnecessary. Free samples Personalized Christmas Cards, Stationery, Napkins. Write today. It costs you nothing to try. Cheerful Card Co., 10 White Plains, New York.

BEAT high prices of Haircuts. "Cut Your Own Hair Device." Quick seller every home. Good profit for you. Write Barbour, 134 South Jefferson Avenue, Peoria, Illinois.

YOU will make more money day after day, year after year, selling DuPont nylons priced to sell and repeat. Details Free. Write today. Arch Hosiery, 104 N. Fifth St., Phila. 06, Penna.

SHINE Shoes Without "Polish." New invention. Lightning seller. Shoes gleam like mirror. Samples sent on trial. Kristee 150, Akron, Ohio.

SELL friends amazing value Christmas, All Occasion greeting cards, new type gift wrappings, gifts that are different. Make up to $1.00 a box. Bonus. Experience unnecessary. Request Feature samples on approval and free samples Name Imprinted Christmas Cards, Stationery, Napkins. New England Art Publishers, North Abington 702-B, Mass.

FAST sellers. Big demand. Catalog. Parker Drug Co., Hoboken 6, New Jersey.

OKURA With Liquid Rubber Pays 200%. New miracle transparent coating protects, preserves, glamorizes floors, walls, linoleum, furniture, autos. Resists acids, soap, water, alcohol. Waterproofs wet basements. Big seller. Everyone needs. Rubber Products, New Haven 13, Conn.

AMAZING possibilities distributing our exclusive Good Shepherd Bible on liberal time payment plan. Universal appeal! Everyone a prospect! For free information write Frazier, Box 2579, Dallas, Texas.

MEXICAN Feather Pictures. Sell on sight: 200% profit! Free details. Sample 20c stamps. (No Coins). Sylvias, Apartado 9036, Mexico City.

POWER Mower—$41.80. Delivered. Tax free. Sell friends—neighbors. Rotacut-RP, Excelsior Springs, Missouri.

FREE book "505 Odd Successful Businesses." Work Home! Expect something Odd! Pacific-38C, Oceanside, Calif.

BUY Wholesale thousands nationally advertised products at big discount. Sent free "The Wholesale Plan." American Buyers' Service, 629-S, Linden, Buffalo, N. Y.

CALL On Friends with sensational Christmas Cards in handy assortments. Price, $1.00. Profit up to 50c. Also popular-priced Personal Christmas Cards, Everyday Assortments, etc. Samples on approval. Wallace Brown, Dept. N-4, New York 10, N. Y.

STOP oil pumping! Restore compression! 200,000 mile guarantee! Only $3.00. Nerlind, 1505 Lincoln, Laredo, Texas.

OPPORTUNITY for unusual profits, selling nationally known appliances, watches, etc. B. Humphries, Box 2323, Asheville, North Carolina.

SALESMEN, Distributors, fast selling costume jewelry direct from factory. Big picture catalog free. Pickcraft, C-19 Bank, Attleboro, Massachusetts.

AMAZING Money Making Offer—$50 or more selling 100 boxes America's Leading Christmas Cards. Samples On Approval. Complete Line. Free Samples Personal Christmas Cards and Stationery. Sensational Bonus. Write, Lorain Art Studios, Dept. 108, Vermilion, Ohio.

NEED Money, $50.00 Yours. Sell only 100 boxes New Xmas Cards. Other amazing offers. Free samples imprinted cards, feature box assortments on approval; over 100 profitable items. Work with a national leader. Pen-'N-Brush Dept. PS-7, 139 Duane St., New York City 13.

NEW Bathroom Deodorizer. Hangs on wall. Banishes odors bathroom, kitchen. Lightning seller. Samples sent on trial. Kristee 151, Akron, Ohio.

IS $210 a week worth a postcard to you? Then rush card with name and address for special Free Trial Plan that sells amazing new Automatic Refrigerator Defroster "like hot cakes!" Write to Mr. Lewis, D-Frost-O-Matic Corp., Dept. K-103, 173 W. Madison, Chicago 2, Illinois.

CALIFORNIA sweet smelling beads, sensational sellers. Particulars free. Mission, 2328P West Pico, Los Angeles 6, Calif.

GET Into Million Dollar Work Clothes Business! Earn big money now, unlimited future! Sell finest-quality embroidered uniforms and work clothes to factories, garages, service stations, lumber yards, everybody! Huge profits possible. No experience needed. Gorgeous selling kit, actual fabric samples, everything Free! Write Topps, Dept. 547, Rochester, Ind.

ADVERTISING book matches—Cash in on big demand—sell Union Label matches. Cuts for all businesses and political parties—Free powerhouse selling kit—low prices—protection guaranteed on repeat orders—Cash commissions. Superior Match Co., Dept. P-752, 7530 Greenwood, Chicago.

SIDELINE for energetic salesmen—sell advertising specialties, calendars. Earn $500.00 monthly easy. Big commissions advanced, bonuses. Samples furnished. Continental Calendar, 542-M So. Dearborn, Chicago.

AD Matches! Sell Amazing Designs—20, 30, 40 and 240-light book matches. Biggest spot cash commissions; every business a prospect. Low prices for high quality. Repeats. Start without experience; men, women; full, part time. Buy Nothing! Sales kit furnished. Match Corp., Dept. PS-31, Chicago 32, Illinois.

45 EDUCATIONAL & INSTRUCTION

BOOKKEEPERS! Increase your earnings! Operate your own simplified "Dollar-A-Week" Bookkeeping and Tax Service. Full or spare time. Details Free. No obligation. Ellis, Box 203-G CedarGrove N.C.

LEARN Piano Tuning, Repairing—at home in 30 days. Unlimited income. Phonograph recordings, tools and instructions furnished. Write Capitol City Tuning School, Department C-733, 129 East Michigan, Lansing 16, Michigan.

USED Correspondence Courses and Books sold and rented. Money back guarantee. Catalog free. (Courses Bought.) Lee Mountain, Pisgah, Alabama.

HIGH School—No Classes. Study at home. Spare time. Diploma awarded. Write for Free catalog. HBA-14 Wayne School, 2527 N. Sheffield, Chicago 14, Ill.

WANT A Diesel Job? New Opportunities to increase income. Higher Pay. More Money. We can help you Qualify. Tools. Shop method home training. Write today! Diesel, Tractor, Heavy Equipment Division, Interstate Training Service, Dept. 2-G, Portland 13, Oregon.

PIANO Tuning Pays. Learn this profitable profession at home. Our Tonometer and mechanical aids make learning easy. No knowledge music necessary. Diploma granted. Largest and oldest school—51st year. G. I. Approved. Write for booklet. Niles Bryant School, 77 Bryant Bldg., Washington 16, D. C.

BE A Real Estate Broker. Study at home or in classrooms in leading cities. Write for big illustrated free book today. Weaver School of Real Estate, Suite 301 Law Bldg., Kansas City, Mo.

THE Collection Agency business is one of finest opportunities today. Write G. H. Cole, Syracuse 2, New York, for free folder.

OWN Collection Agency Office. Pays big. Free details. Franklin Credit, Roanoke 7, Virginia.

WANT U.S. Gov't Job? Start high as $73.00 week. Men-Women. 95,000 jobs open! Quality Now! Experience usually unnecessary. Free 32-page Civil Service book showing jobs, salaries, requirements, sample tests. Write: Franklin Institute, Dept. L-22, Rochester, New York.

BECOME a Doctor of Psychology or Metaphysics. Teach secret of contentment, happiness. Win degree of PsD. or MsD. Solve mental worries. Free book. College of Universal Truth, 5153-K N. Clark, Chicago.

MEDICAL Laboratory Technicians in great demand. We train you in your own home. Catalogue free. Imperial Technical Institute, Box 973-B, Austin, Texas.

WELDING training pays at Hobart Welding School. Box P-722, Troy, Ohio. VA Contract. Best equipment. Catalog Free.

HYPNOTISM—Homestudy! Diploma! Hypnology Institute, 235 S. Brevard, Charlotte, North Carolina.

AUCTIONEERING. Sample lesson Free. Nelson Auction School, Renville PS, Minn.

SAVE algebra worry. New, analytic method teaches instantly. Rush $1. Guaranteed. Ziemban, 6123 Orchard, Dearborn, Michigan.

USED Correspondence Courses and Educational Books Bought, Sold, Rented. Catalog Free. Educational Exchange, Summerville, Georgia.

INCREDIBLE! Become mental superman overnight! Free Booklet! Bijou, Box 1727-VIT, Hollywood 28, Calif.

WONDER drugs!—cures! Lifesaving knowledge! Free Booklet! Bijou, Box V33-1727, Hollywood 28, Calif.

HYPNOTIZE The First Day. This method has been a closely guarded secret for years. Now revealed for the first time. Send today $2.00 complete. Lewis, the Hypnotist, 4009 Lake Park, Chicago 15, Ill.

46 CONTESTS

$100,000—CONTESTS. Contests—Contest Books—Services. Contests, 13H Earl, Red Bank, N. J.

47 DETECTIVES

DETECTIVE Training. Phillips Secret Service System, 1917-C North Kenneth, Chicago 39, Ill.

DETECTIVES—Work home—Travel. Experience unnecessary. Detective Particulars free. Write Wagoner, P-125 West 86th, New York 24.

48 LANGUAGE OUTFITS

LISTEN. Learn A Language by Linguaphone. At home, quickly easily correctly, master Spanish, French, German, Russian, Japanese—any of 29 languages through Linguaphone Conversational Method. Add to service, job, travel opportunities. Send for Free Book. Approved for Veterans' Training. Linguaphone Institute, 5407 Radio City, N.Y.C.

50 BUSINESS SERVICE, INFORMATION, NAME LISTS

YOU Can Buy It Wholesale! Particulars free. Buda, 120 Caroline Street, Canastota, New York.

MAILING Lists. All kinds 1000 $5.00. Dixie Service, King, N. Carolina.

51 SPECIAL SERVICES

NEW Orleans! Letters remailed 25c each. Levy, 4019 Dumaine, New Orleans, La.

52 AUTHORS SERVICE

LOOKING For A Publisher? Write for free booklet PS-7. Vantage Press, 230 West 41st, New York.

I Want New Writers to cash checks of $1 to $100 offered daily. The easiest way to write for pay. No previous experience necessary. Free Details. Saunders M. Cummings, 468-15 Independence Bldg., Colorado Springs, Colorado.

BEGINNING Writers: Let us show you How to get $1 to $20 checks in your daily mail doing simple spare time writing. Experience unnecessary. Details Free. W. Herwell, 7016 Euclid, Cleveland 3, Ohio.

AUTHORS! Manuscripts typed. $.50 per thousand words. $1.00 deposit must accompany all manuscripts. Send to: Pulis Associates, 2118 4th St., N.E., Washington 2, D.C.

53 ADVERTISING

ADVERTISE: 24 words, 100 Canadian Newspapers, $5.50. Lists Free. Advertising Bureau, 10511-P Springfield, Chicago 43.

54 CARTOONING, SIGN PAINTING, CHALK TALKS

"HOW To Make Money With Simple Cartoons"—A book everyone who likes to draw should have. It is free; no obligation. Simply address Cartoonists' Exchange, Dept. 197-C, Pleasant Hill, Ohio.

LEARN Sign Painting at Home. Test Lesson Free. Ben Kerns, Box 812-PS, Greenville, South Carolina.

CHALK Talks. Laugh Producing Program. $1.00. Illustrated Catalog 10c. Cartoonist Balda, Oshkosh, Wisconsin.

55 TYPEWRITERS & OFFICE MACHINES

TYPEWRITERS $22.50. Adders, Duplicators $13.25. Meier's, 118 Spruce, Wichita 7, Kansas.

TYPEWRITERS, Printing Devices, Office Machines supplies appliances. Dixie Graph, King, N. Carolina.

VARI-Typers, reconditioned electric typewriters $100—Sachs, 119 West 23rd, New York 11.

SAVE 10%—new portable typewriters. Anywhere. Write Brackley, Farmington, Maine.

56 RUBBER STAMPS & OFFICE SUPPLIES

RUBBER Stamps. Illustrated catalog 13 free. Hackney, 210 Fifth Ave., New York 10, New York.

3 LINES 50c; Pads 35c; Signatures $2.35. Printright, Wauwatosa, Wisconsin.

57 PRINTING, MULTIGRAPHING, ETC.

1000 BUSINESS Cards $2.50. Prepaid samples Free. Reliable Print Shop, 907 East Jefferson, Louisville 6, Ky.

PRINT Without A Printing Press. Big Money! See page 30.

BUSINESS Printing. Free samples, prices. Sutton Printing, Box 853-S, Waycross, Georgia.

PRINTING—Lowest prices. Free samples. Weeks, 242 Woodycrest, Nashville 11, Tenn.

BILLHEADS, statements, letterheads, $5\frac{1}{2}$x$8\frac{1}{2}$. 2000—$8.95; 4000—$15.25, postpaid. Samples. Community Press, E. Aurora 2, New York.

IDEAL inexpensive gift for men in Armed Forces. Free details. Mersand, 1906 Strauss, Brooklyn 12, New York.

QUALITY Mimeographing $8\frac{1}{2}$x11, $1.35 hundred. Limit 30 lines. 4c each additional line. 250 $2.45. 500 $3.60. 1000 $5.75. Remailing, forwarding 25c each. Sinclair Advertising, Dept. B, Box 762, New Orleans 12, La.

500 PRINTED labels with your name and address 50c. 1500—$1.00. Shipping labels 3x$4\frac{1}{2}$." 2,000—$5.00. Boozinny, 152-A Victor, Detroit 3, Michigan.

2000 6x9 CIRCULARS $9.00 plus postage. Other Printing. Samples 6c. Brunk, 3530 Osceola, Chicago 34.

BUSINESS printing, samples Free. Feole, 2718 East 58th Street, Huntington Park, Calif.

GUMMED Labels, Stationery. Free list. Reed, Box PS-135, Spiro, Oklahoma.

58 PRINTING OUTFITS, SUPPLIES

PRINT your own cards, stationery, circulars, advertising. Save money. Simple rules. Print for others, nice profit. Raised printing like engraving too. Have home shop. Details free. Kelsey Presses, L-8, Meriden, Connecticut.

MAKE your own, self-molding, rubber printing cuts. Plexirubber, Argyle 2, Wisc.

PRINTING Presses, Type Supplies. Lists 3c. Turnbaugh Service, Loysville, Penna.

59 PATENT ATTORNEYS

INVENTORS: Without obligation, write for information explaining the steps you should take to secure a Patent. John N. Randolph, Registered Patent Attorney, 207 Columbian Bldg., Washington 1, D. C.

C. A. Snow & Co.—S-427. Snow Building, Washington 1, D. C. Registered Patent Attorneys. Write for information.

INVENTORS: When you are satisfied that you have invented something of value write me, without obligation, for information as to what steps you should take to secure a Patent. Write Patrick D. Beavers, Registered Patent Atty., 938 Columbian Bldg., Washington 1, D. C.

INVENTORS: Learn how to protect your invention. "Patent Guide" containing detailed information concerning patent protection and procedure together with "Record of Invention" form will be promptly forwarded to you upon request—without obligation. We are registered to practice before the U. S. Patent Office and prepared to serve you in the handling of your patent matters. Clarence A. O'Brien & Harvey Jacobson, Registered Patent Attorneys, 22B-G District National Building, Washington, D. C.

INVENTORS. For "Invention Record" form, contact Carl Miller, Registered Patent Attorney, Woolworth Building, New York.

PATENT Protection — This well-known organization will send you promptly upon request and without obligation a booklet containing detailed information concerning steps to take to protect your invention by a United States Patent. Victor J. Evans & Co., Merlin M. Evans, Registered Patent Attorney, 741-H, Merlin Building, Washington 6, D. C.

INVENTORS—If you believe you have an invention, we can make a preliminary search on your invention and advise you whether we think it can be patented. Send for copy of our Patent Booklet "How to Protect Your Invention" and "Invention Record" form. No obligation. McMorrow, Berman & Davidson, Registered Patent Attorneys, 143-P Victor Building, Washington 1, D. C.

PATENTS—Irving L. McCathran, 316 McLachlen Bldg., Washington 1, D. C. Registered Patent Attorney.

FOR INVENTORS

SEARCHES—Put your patent searches in the hands of a Registered Patent Attorney or Agent, as he qualifies to give a worthwhile patentability report. Record of Invention form upon request and information on patent protection. Patrick D. Beavers. Registered Patent Attorney. 939 Columbian Bldg., Washington 1, D. C.

INVENTORS. For "Invention Record" form, contact Carl Miller. Registered Patent Attorney. Woolworth Building. N. Y.

INVENTORS: Without obligation, write for information explaining the steps you should take to secure a Patent on your invention. John N. Randolph. Registered Patent Attorney. 206 Columbian Bldg., Washington 1. D. C.

INVENTIONS Promoted. Patented or Unpatented. Established 1911. Write Adam Fisher Company. 183 Enright. St. Louis. Mo.

INVENTORS: Learn how to protect your invention. "Patent Guide" containing detailed information concerning patent protection and procedure together with "Record of Invention" form will be promptly forwarded to you upon request—without obligation. We are registered to practice before the U. S. Patent Office and prepared to serve you in the handling of your patent matters. Clarence A. O'Brien & Harvey Jacobson. Registered Patent Attorneys. 22A-G District National Building. Washington. D. C.

INVENTORS: If you have an invention for sale, patented or unpatented, write Institute of American Inventors. Dept. 30A. 631-E St., N.W., Washington 6. D. C.

CASH For your idea. 280 manufacturers need inventions, patented or unpatented. List free. Invention Bureau. 208-S Clinton. Oak Park. Illinois.

INVENTORS—If you consider your invention to be something of importance, take steps to protect it with a United States Patent which gives you the right to exclude others from making, using and selling your invention as claimed. "Patent Protection for Inventors" outlines steps to take to secure patent protection. Mailed promptly without obligation. Victor J. Evans & Co., Merlin M. Evans. Registered Patent Attorney. 742-H Merlin Building. Washington 6. D. C.

INVENTORS! For "Copyright, Design & Patent Guide" contact Mr. Metzlerr. 11 West 42nd. New York 18.

INVENTORS: Let us help you sell your idea. Send 25c for our successful sales plan. Write Visioneering Inc., Wells Bldg., Milwaukee. Wisconsin. Department S.

ADVANCE your invention through the facilities of Helgeson & Company. Box 842-A. St. Louis. Mo.

PATENT Searches $5.00. 48-hour service. Patent Applications and Drawings prepared. Protection forms free. Write Miss Ann Hastings. P. O. Box 176. Washington 4. D. C.

INVENTORS—If you have worthwhile invention, we have a plan for selling it. Without obligation, write National Patent Sales Company. Dept-A. Box 370. Richmond. Virginia.

•NEW Ideas, inventions promoted. Patented, unpatented, patent pending industry Armed Forces write "New Ideas", P781. Marion. Indiana.

PATENT Searches. $5.00 including patent copies. Free protection forms. 48 hour service. Accurate and reliable results. All inventor's services. Patent Service Institute. 945-B Pennsylvania Avenue. Washington 4. D.C.

ELECTRONIC problems, devices, advice. Free information. Registered Engineer. 5208-B Onacrest. Los Angeles 43.

INVENTORS—If you believe you have an invention, we can make a preliminary search on your invention and advise you whether we think it can be patented. Send for copy of our Patent Booklet "How to Protect Your Invention" and "Invention Record" form. No obligation. McMorrow, Berman & Davidson. Registered Patent Attorneys. 143-M Victor Building. Washington 1. D. C.

CASH for Ideas, Inventions. Garcia, "A" Street Station. Clearwater 1. Florida.

INVENTIONS. Sold, leased, complete services. M. Joyce Humphries. 1425 Landtitle. Philadelphia 10.

61 INVENTIONS WANTED

INVENTIONS Promoted. Patented or Unpatented. Established 1911. Write Adam Fisher Company. 183 Enright. St. Louis. Mo.

INVENTORS—Good patented, patent pending inventions wanted by manufacturers. Booklet free. Market Contacts. 719-B2 Magnolia. Tupelo. Miss.

INVENTIONS Wanted by Manufacturers. Patented-Pending only. Free Details. Inventors Exchange. Dept. D. Hartford 1. Conn.

INVENTORS: Hundreds of manufacturers have requested our assistance in locating marketable new products. Complete information free. Institute of American Inventors. Dept. 30C. 631—E Street. N.W., Washington 4. D. C.

SCHAULAT Associates. Agents, purchasing and marketing inventions. 1110 Brentwood Blvd., St. Louis. Missouri.

WRITE for information about service for selling inventions. Patent Engineering Development Co. 624 Southern Standard Building. Houston. Texas.

INVENTIONS wanted. Patented or unpatented. Write for details. Global Marketing Service. 1404 Mitchell Street. Oakland 1. Calif.

INVENTIONS Wanted. Patented or Patent Pending. 21 years experience Promoting Inventions. National Service Bureau, 3122 Meramec. St. Louis 18. Mo.

62 PATENTS FOR SALE

INSERTED tooth saw requiring no holders, adaptable, cross, combination, rip, circular, band large and small. Dawson's Electrosharp. 702 Utah. Butte. Montana.

64 MODELS, MODEL SUPPLIES

SHIP and Yacht model fittings: blueprints. Send 25c for illustrated catalog No. 27—Listing hundreds of items. A. J. Fisher. 1002-2 Etowah. Royal Oak. Mich.

SHIP Model and yacht supplies, complete large 64 page catalogue. 30c. Wm. Wild. 510 E. 11th St., New York City.

STAGECOACH surrey, horses, 20 kits. Fenders 10c. Sample buckboard $1.00. Tontz' Country Store. Elsinore 9. Calif.

AIRPLANES, Boats, Trains, Autos. Free Illustrated Literature. Berns Hobbys. 5940 N. 19th. Phila. 41. Penna.

STEAM engines, boilers, castings. Catalog 25c. Anton Bohaboy. 2297 Price. Rahway. New Jersey.

65 HOME CRAFTSMAN

LEATHER, tools, lacing, supplies. Free Catalog. National Handicraft. 199 William St., New York 7.

OUR biggest Leather and Craft Catalog yet! 1000's of items. Send 25c (refunded with 1st order). Russo Handicraft Supplies. Dept. 40. 245 S. Spring. Los Angeles. California.

LEATHERCRAFT. Copper, textile painting, beadcraft, shellcraft, many other crafts. Big free catalog shows everything you need. Kit Kraft. 7377 Melrose. Hollywood 46. Calif.

"PRACTICAL Painting, Wood Finishing" shows how to get professional results. Furniture finishing, workshop projects, home decorating. Complete Modern brush and spray methods. Tricks you've never seen. Write Home Craftsman. 115-F Worth St., N. Y. 13.

90 ALL new, full size lawn ornament and novelty patterns, up to 20" high. Only $1.00. Mastercraft 72S. 7041 Olcott. Chicago 31. Illinois.

LEATHERCRAFT Everything needed by beginners, advanced hobbyists and professional leatherworkers. Largest stock of supplies in U. S. Moderate-priced tooling leathers, top-quality calfskins, tools, supplies, kits. Send 10c for Big Catalog. J. C. Larson Co., 820 S. Tripp. Dept. 2254. Chicago 24. Illinois.

SQUAREKNOTTERS: Make belts, hand bags, etc. Quality cord samples with catalog free. Special! Beginner's book, catalog and samples 10c. P. C. Herwig Co., Dept. P40. 121 Sands St., Brooklyn 1. N. Y.

MOLD making simplified for concrete flamingos and duck sets instructions and illustrations. $2.00. Stanley Both. Bay-View Road 5. Hamburg. New York.

LEATHERCRAFT kits. Profitable. Catalog 25c. Wholesale Leathercraft Company. District 763. Box 165. PS-2. Milwaukee 14. Wisconsin.

FULL Size Patterns for Gun Rack, Shopping Cart, Pet Feeder, Book Ends $1.00. Willards. Canoga Park 72. California.

LEATHERCRAFT. New Stylecraft folder Free. New Kits illustrated. Filigree Belts, Billfolds, Purses, etc. Send 25c new catalog. Refunded first order. Apache Leather Co., 2804 East Washington St., Phoenix. Arizona.

89 FULL size Jig Saw patterns of beautiful shelves, ornaments, toys, novelties. Plus "How, Where to Sell." Only $1.00. Mastercraft 74S. 7041 Olcott. Chicago 31. Ill.

KNOCKDOWN Cedar Chest, Lumber and Veneers. Free Price List. Giles Co., Brownsboro. Alabama.

WILD animals! Ancient locomotives! Six-foot train! 34 Jigsaw Wall Patterns, 50c! Pauls Plans. 2233A N. 35. Milwaukee 8. Wisconsin.

JIG Saw owners—tired of old ideas? See our unique patterns. Sample and illustrated folder 10c. Walker Studio. PS6. 4343 Lindell. St. Louis 8. Missouri.

FULL Size Patterns. Furniture, Novelties, Toys. Illustrated catalog 10c. Willard's. Canoga Park 72. California.

WHALEBONE! Leathercraft! Coins! Balsawood! List 10c. Fairway Company. Box 121. Rye. New York.

HAWAIIAN full size patterns. Polynesian bowls, trays, perfume flacons, costume jewelry. Easily made by home craftsmen. Hawaiian recipes, party suggestions, all for $1.00. Trader Hall's. Dept. S. Box 155. Honolulu 10. Hawaii.

16 NEW lawn chairs, 22 picnic tables, benches, trellises, etc. All 38 plans with necessary full size patterns. $1.00. Mastercraft 73S. 7041 Olcott. Chicago 31. Ill.

LEATHERCRAFT Tools, Leather Embossing Plates, Craft Accessories, Dies. Catalogue 10c. Louis Jones Engineering Company. 1613 Main. Fort Worth. Texas.

66 BUILD IT YOURSELF

BUILD Your Own "Tractor". Free information. Eltraco D-5. Camptonville. Calif.

FREE Information about most maneuverable small riding tractor in use. Low cost. Easy to build. Turns around inside three foot circle. $1.00 on How To Build with Manufacturer's Patent Plans. Turn-O-Bout. 1668 Willamette. Eugene. Oregon.

SEND for big new 1952 illustrated catalog that will show you how to turn your spare time into cash—making quick-selling, highly profitable lamps. Every home a prospect. Hundreds doing it—you can, too. No experience or special tools required. Catalog No. 7 contains 36 pages filled with shades, shade frames, figurines and bases, oil lamp converters, boring compound, and dozens of similar items. Also all kinds of sockets, cords, pipes, harps, finials, bases and hundreds of other parts—everything you need. Special 8-page section shows 6 beautiful lamps in kit form—ready to assemble. You buy wholesale, sell at retail—make Big profits. Send 25c today for new 1952 catalog and wholesale price list—you'll be glad you did. The 25c will be refunded on your first order. Gearon Co., Dept. 500-A7. 27 S. Desplaines. Chicago 6. Ill.

GRANDFATHER Clock shoptested plans dollar. Thousands built. Kuempel Clocks. Minneapolis 16.

"CONCRETE Block Homes." 32-page booklet, on how to build. $1.00. H. C. Lightfoot. Civil Engineer. Richboro. Penn.

FREE handbook, build sawmills, block machines, freezers, tractors, scooters. Nichols Company. Purvis 3. Mississippi.

BUILD your own motorscooter factory made frames, wheels, motors, parts. American Moto-Scoot Co., Chicago 25. Ill.

BUILD with Concrete. Fieldstone. Earth. Movable Form System cuts costs. Construction simplified. Free literature. Smith PS. Box 36. Eagle Creek. Oregon.

AUTOMATIC switch for your turn signals, drawings, instructions 50c. Armstrong. Box 4001. Northeastern Station. Dearborn. Michigan.

HURRICANE—Wire Fabric Window Guards, protective, durable, lightweight, low costs. No skill, no special tools or materials required. Quickly made. Instructions $1.00. Pohler's Saw Shop. P.O.B. 383. Hollywood. Florida.

67 OLD GOLD, JEWELRY, WATCHES, ETC.

RHINESTONES, jewelry settings, cameos, sequins, beads. Send 10c for Illustrated Catalog. J & M Novelties. Dept. CH-4. Griffith. Indiana.

HIGHEST Cash Paid For Old, Broken Jewelry, Gold Teeth, Watches, Silverware, Diamonds, Spectacles, Platinum. Free information. Satisfaction Guaranteed. Rose Smelting Company, 29-Y East Madison, Chicago.

5000 JEWELRY styles, you can easily make yourself—Pins, Earrings, Bracelets, Rings, matched ensembles. Instructions and catalog 10c. Barrys, 106 Ardsley Court, Newark, N. J.

JEWELRY making. Send 20c for illustrated catalog. Milady-Fair Co., G.P.O. 1328, New York City 1.

GOLD or Silver Wire. Solders, guaranteed fineness. .120 to .0035 diameter. Specify size and carat for quotation. D. A. Sutch, Croydon Rd., Baltimore 7, Md.

68 TOBACCO & PIPES

NEW pipe stops tongue bite. Costly. Free Circular. Kleensmok, Box P-597, Johnson City, Tennessee.

50 CIGARS, $2.25. Irregulars of a popular brand. Others. Public Cigar Co., East Orange 2, New Jersey.

PIPE tobacco flavors, unique, interesting, information free. Cozza Pharmacist, Pequannock 2, New Jersey.

69 FOR THE HOME

YOUR house or garage address number—weather resistant—15c. Neven, 4713 Longshore St., Phila. 35, Penna.

TUB-Tite seals cracks around bathtubs and tilewalls. Firmly cements linoleum, wood, metal, glass. Plugs leaking tanks. Tube $1.25 ppd. Hans Kraney, 2440 Losantiville, Cincinnati 13, Ohio.

DO it at home and save. Perfex lawn mower sharpener $1.25, shine-boy shoe holder $1.95. Jarcho-Western Supply Co., 1442 W. Slauson, Los Angeles 47, Calif.

70 OF INTEREST TO WOMEN

AMAZING Big Profits Selling Exclusive Sunshine Christmas Cards. Nationally famous 21 for $1.00 assortment is unequalled, sells on sight. Other tremendous Sunshine Values: Merry Holly-Day, Nature Prints, Park Avenue Kromekotes, Scripture Text, Gift Wraps, Stationery, etc. Send for Samples on Approval. Earn Big Money Now! Sunshine Art Studios, Dept. PO-7, Springfield 1, Mass.

FUGITIVE husbands traced. Alimony aided. Information $1. Tracer, 806 N. Flint St., West Monroe, La.

BIRTHDAY Candles. Eighteen boxes (432) $1.00 prepaid. American Wax & Supply Co., 2422-C Hutchinson, Chicago 18, Ill.

71 FOR SALE MISCELLANEOUS

THE World's Most Amazing Catalog. 230 fantastic pages of sensational bargains at savings up to 85% in War Surplus and Factory Close-Outs. Values in General Merchandise such as clothing, housewares, hand and power tools, foam rubber, outdoor and camping equipment, photo supplies, plastics, metals, hydraulic cylinders, valves, pumps and many hundreds more. Send only 50c to cover handling and mailing. Paley Supply Co., Rm. 15, 2263 E. Union Ave., Los Angeles 58, Calif.

CAR expense recorder snaps on visor of car, one dollar. Rajah Sales Co., 1638 Granville, Chicago 26, Illinois.

BRONZE Ceramic Hound Dog $1.00. Alyene Myer, 1604 Weldon, Fresno, Calif.

NOISE. New Ear sound filter stops loud noises, passes ordinary sounds. Protect your hearing, increase efficiency, comfort. No wires, batteries, lasts indefinitely. Not hearing-aid. Free details. Anza Co., 3560B 20th St., San Francisco 10, Calif.

CAMERAS, Appliances, Silverware etc. Up to 45% off list price. Straus Supply, 113 West 42nd Street, New York City.

WAX—For every purpose. Write for prices. American Wax & Supply Co., 2422 Hutchinson, Chicago 18, Illinois.

72 WANTED MISCELLANEOUS

SCRAP Mercury (Quicksilver) Tantalum—Bismuth—Tungsten. Metallurgical Products Co., Established 1909, 35th & Moore Sts., Philadelphia 45, Pa.

74 RAZOR BLADES, SHAVERS

125 DOUBLE Edge Gillette type razor blades. Guaranteed. $1.00 Chrome. 634 So. St. Clair, Girard, Ohio.

76 DRAWING, SUPPLIES & EQUIPMENT

DRAFTING and artists' materials catalog—thousands of items—25c (deductible first $2 order) Gordon's, 219 Madison, Chicago.

77 TREASURE FINDERS

TREASURE Hunters! New 11-pound featherweight Model 101 locator for gold, silver and minerals. Money-back guarantee best available. Also Geiger Counters for uranium prospectors. Complete information free. The Goldak Company, 1540 W. Glenoaks Blvd., Glendale 1, Calif.

GOLD, Silver, Metal Detectors, Geiger Counters for Uranium, Mineralights. Sensational new fully guaranteed models. None Finer. Information Free. Detectron Co., 5631 Cahuenga Blvd., North Hollywood, California.

SELECTIVE metal and mineral detector. Revolutionary design. Distinguishes metals from black magnetic sands. Readily detects metals under salt water. Free literature. Gardiner Electronics Company, Department 22, 2018 N. Dayton, Phoenix, Arizona.

TREASURE—M-Scope Geiger Counters—Mineral Locators. Why buy something inferior when you can buy the best at a lower price? Backed by years of experience. Fully guaranteed by factory. Detects minerals, metals, gold, silver, coins. Payment plan available. Proven superior performance. Free 16 page illustrated booklet. Fisher Research Lab., Inc., Palo Alto, Calif.

78 WATCH REPAIRING

WATCHMAKERS' hobbyists' complete informative catalog 20c. Bengal Company, Culver City, Calif.

10 HIGH-grade Swiss Ladies' and Gents' Wristwatches needing minor repairs, $18.00. Write for prices. B. Lowe, Holland Bldg., St. Louis 1, Mo.

79 MISCELLANEOUS

OUTDOOR Toilets, Cesspools, Septic Tanks cleaned, deodorized with amazing new product. Just mix dry powder with water; pour into toilet. Safe, no poisons. Save digging, pumping costs. Postcard brings free details. Burson Laboratories, Dept. E-53, Chicago 22, Illinois.

NEED a Gift? Sample literature free. Box 48, Brooklyn 25, N. Y.

LEATHERCRAFT For Pleasure or Profit. Make easy-to-assemble purses, belts, gloves, woolskin toys, 100 other items for gifts or to sell. Send 10c today for big catalog. Largest Leathercraft stock in U. S. J. C. Larson Co., 820 S. Tripp, Dept. 2255, Chicago 24.

RECEIVE mammoth mails, magazines, catalogs! Three months 25c year 50c. Waddell's Directory, 341-D East 76th, New York 21.

HAWAIIAN Souvenirs: Coconuts; Coco-Palm Hats; Sea Shells; Volcano Lava; Orchids; Shirts, $1.00 postpaid introductory assortment, catalog. Hawaiian Souvenir Co., Box 5417, Honolulu, T. H.

PANNING Gold lesson—Catalogue Beginners supplies, Mining Books, Maps, "Where To Go". Free. Old Prospector, Box 729D2, Lodi, Calif.

ROBOTS, Mechanical Brains, Computers, Logic Mathematics: Publications, Courses, Squee—Robot Squirrel—Construction Plans, $4.00. Simon—Baby Brain—Plans, $5.50. Circuit Algebra—Introduction, $1.50. Returnable within Week. Free Catalog. Berkeley, R-34, 19 Milk, Boston 9, Mass.

BIG interesting mails three months 25c, year $1.00. Harvey Teeple, Decatur, Ind.

FLASH! Electrical tester tests AC, DC circuits by glow. 65c ea. P.P. 2 for one dollar. G. L. Electric, 1012 E. 45th, Seattle 5.

URANIUM prospecting information Free. Prospector, Box 142-I, North Battleford, Saskatchewan, Canada.

BUYERS for anything you have to sell. W. Tidaback, 506 Buchanan St., Hillside 5, New Jersey.

SCREWDRIVERS! Molded plastic handles. Guaranteed set with 12", 10", 8", 7", 6", 4" sizes. Only $2.49. Jonco, Box 222, Westport, Conn.

HOBBYISTS! Garagemen! Farmers! Housewives! Boys! Anyone! Keep small articles orderly and easily accessible. Use KanKlips, patent pending. 18—$1.00, postpaid. Guaranteed. Information free. Hiarings, 614 Northeast Third, Madison, S. D.

SKYRO—Plane-Metallic, flies 2000 ft. up like kite. Send $2.98. Sax-On, 3840 Fullerton, Dept. C-1, Chicago 47.

80 PERSONAL

"HOW Can I Find Out?" You Can! Information discreetly developed. Any matter, person, problem, anywhere. Worldwide. Officially licensed, bonded service. Established 1922. Reasonable. Confidential. William Herman, 170 Broadway, N. Y.

BRAZIL—Pretend you're here! I reairmail your letters with interesting new Brazilian stamps for $1.00 each. I also airmail 3 beautifully colored picture postcards for remailing $1.00. Address Carmencita, Caixa postal 2706, Rio De Janeiro.

DETECTIVE'S Opportunities. Detective Particulars free. Write, Wagoner, P-125 West 86th, New York 24.

PSORIASIS Victims: Hopeless? New Discovery! Free Trial offer. Write Pixacol, Box 7097-S, Cleveland, Ohio.

HAPPINESS, Romance, Your future. Interesting information sent single people Free. Write Strone, 2488-PS Concourse, New York City 58.

STAMPED letters remailed 10c each. Replies forwarded, dollar per month. California House, Box 1131, Long Beach, Calif. Dept. C.

BORROW by mail. Loans $50 to $600 to employed men and women. Easy, quick. Completely confidential. No endorsers. Repay in convenient monthly payments. Details free in plain envelope. Give occupation. State Finance Co., 323 Securities Bldg., Dept. N-14, Omaha 2, Nebraska.

LETTERS Remailed 25c. Private receiving address. Monthly rates. Shanks, Box 3110-G, San Francisco 19, California.

LETTERS remailed 25c. Six scenic postcards $1.00. Winnie Allen, 210 Academy Street, Kingstree, South Carolina.

JOIN National Guild Hypnotists. Details, Hypnodiscs etc. 10c. Guild 48B Harlem, Dorchester 21, Massachusetts.

MEXICAN Legal Practice Reliably Conducted. Box 1736, El Paso, Texas.

CONFIDENTIAL information for single people, leading to happiness—romance. Write today! Karl Miles, Ph.D., Director, Personal Acquaintance Service, Inc., 601-G South Vermont, Los Angeles 5, Calif.

INFORMATION for single people by Human Relations Consultant, Dr. B. Long, Box 375, Los Angeles 53, Calif.

DISTINCTIVE nameplates for home entrance or personal property. Your name permanently engraved on durable red anodized aluminum. Ideal for apartments. Decorative. Weatherproof. Two duplicate nameplates sent post paid for $1.00. Print name desired. Maximum 15 letters. Satisfaction guaranteed. Victor Engraving Service, Box 337, Mesilla Park, N. M.

"INTERESTING Mails"—25c keeps your mail box full three months. Bentz, Desk H-13, Chatawa, Mississippi.

HAIRSAVERS Booklet. Avoid Baldness. Send $1 to Woods, 6823 Ridge Boulevard, Brooklyn 20, New York.

PSORIASIS Sufferers: Free trial offer! Dermoco, 355-A Imperial, Youngstown 9, O.

MEXICAN Law, General Practice Attorney. 1203 Arizona Street, El Paso, Texas.

HAY Fever magic relief, no medicine $1.00, postpaid. O. H. Yount, Valley Springs, Calif.

SURPRISE Friends, Letters, cards remailed from Hollywood 25c each. Coin. Ten Hollywood cards $1.00. Stone, 1733-S, Hollywood 28, California.

PILES! Tormented with the irritation and discomfort due to piles? Write for free important information. Mutual Products, Box 836-P, Cleveland 22, Ohio.

HOW to get what you want. Proven Philosophy of Success clearly explained, and Personal Chart only $2.00. Your satisfaction guaranteed. Questions welcome. Frank Marney, Box 876, Wichita Falls, Texas.

INCREDIBLE! Become mental superman overnight! Free Booklet! Bijou, Box 1727-VT, Hollywood 28, Calif.

WONDER drugs!—cures! Lifesaving knowledge! Free Booklet! Bijou, Box V3-1727, Hollywood 28, Calif.

WORK CLOTHES BARGAINS!

Special Offer

FREE 10 DAY TRIAL

WORK SHIRTS 79c 3 for $2.29 — Blue, Tan, White — Measure Neck & Arm

WORK PANTS 99c 3 for 2.69 — Blue, Tan, White — Measure Waist & Leg

SHOP COATS $1.79 3 for $5 — Blue, Tan, White — Send Chest Measure

COVER ALLS $1.98 3 for $5.49 — Blue, Tan, White — Send Chest Measure

WHAT A BUY! Surplus stock from a big midwest supply firm makes these gigantic savings available to you! Sturdy, serviceable work clothes, though used, have been washed, thoroughly sterilized and reconditioned. Every garment made of long-wearing wash materials, strongly sewn, with reinforced stitching at points of strain. When ordering please state measurements under item.

SEND NO MONEY! Just send name, complete address, clothing desired (state how many of each), and your color choice (also 2nd color choice). We will ship immediately. Pay postman, plus postage when your order arrives. Or, enclose cash, check or money order, and We Pay Postage. Keep 10 days. Return for full refund of purchase price if not completely satisfied. Order TODAY at our risk!

YOUNG DISTRIBUTING CO. Dept. 488 2605 Elmhurst, Detroit 6, Mich.

NEW! CHEAP! **OIL BURNER** SWEEPING THE COUNTRY!

SALESMEN BIG MONEY

SLIPS INTO ANY COAL RANGE, STOVE OR FURNACE

Amazing quick, intense heat. By finger-tip control. Cheaper than coal. No more shoveling coal or ashes. SENT ON TRIAL. Prove it pays for itself quickly by what it saves. $1 bonus for testing. We'll let you try one in your own home for one month. Write for details today. NORTHWEST MFG. CO., 361-J Main, Mitchell, S. Dak.

Malayan THROWING DAGGER

BALANCED TO STICK! $1.98 postpd

This MALAYAN FIGHTING KNIFE is used for self-defense, killing game, target skill. Powerful, silent, accurate weapon. Splits 1" board at 30 ft.

Fun, Thrills, Excitement! Indoors—outdoors. Learn this Sport! Easy to throw accurately with our clear instructions. Beautiful, heavy-duty 10" knife. Tempered steel. Tough, rawhide-bound handle. Rare souvenir, unusual bargain. Limited quantity. At dealers or send $1.98

WHOLESALE IMPORT CO. Dept. B, 604 Marengo, Alhambra, Calif.

Catalog OF 3000 Novelties 10c

Send 10c for amazing catalog of novelties, live animals, scientific supplies, hobbies, funmakers, planes & boats, looms, magic tricks, joke articles, unusual seeds, gadget timesavers, cameras, optical goods, projectors, movies, lucky jewelry, religious novelties, disguises, musical instruments, stamps, coins, puzzles, fortune tellers, radios, auto & bike accessories, telescopes, magnifiers, compasses, banks, smokers' gadgets, artists' supplies, printing sets, engines, motors, shockers, knives, billfolds, fireworks, guns, rifles, sports, books, games, plants, etc. Send name, address & 10c to:

JOHNSON SMITH & CO., Dept. 535 Detroit 7, Michigan

NEW! CATALOG No 3 NOW AVAILABLE! COLT LOW PRICES

"FRONTIER" & "PEACEMAKER" REVOLVERS

OVER ONE HUNDRED & FIFTY IN STOCK

SEND 50¢ FOR

BIG NEW up to date PHOTO CATALOG #3

DETAILED PHOTOS OF ALL GUNS & COMPLETE STOCK OF AMMO, PARTS, GRIPS, HOLSTERS, ETC.

Catalog Price Deducted from First Purchase

HY HUNTER Dept. 9 5666 W 3rd St., Los Angeles 36, Calif.

join the fun own one!

WHIZZER

America's finest motorbike

The SPORTSMAN—

luxury motorbike at an amazing low price!

Ride, wherever you go, on your own Whizzer! Comfortable, dependable, thrilling. Up to 100 miles on a gallon of gas, speeds up to 35 m.p.h.

EVERYTHING YOU WANT

Heavy-duty 20" wheels. Rugged frame. 5" expander brake, foot operated. Kick starter. Built-in generator. Hi-low sealed beam headlight, tail light. 3 h.p., 138 c.c., 4-cycle automotive-type motor. See your dealer now, or write for illustrated folder today!

WHIZZER MOTOR CO. 318 S. SANFORD, PONTIAC, MICH.

SAVE 50% - THOUSANDS HAVE ASSEMBLED

$42 UP PACKAGED BOAT KITS

27 MODELS

Dinghies, skiffs, racers, inboards, outboards and cruisers. Assemble your own boat, it's easy, it's fun! All parts pre-cut or prefabricated from finest materials. Get all the facts from our big 24 page catalog. See how Packaged Boats are built, how they perform, how exclusive construction features make assembly easy. Includes specifications, performance data plus hardware and paints.

SEND 25¢ for NEW 24 PAGE CATALOG

CUSTOM-CRAFT - DEPT. 5 - BUFFALO 7, N. Y.

BOAT PLANS PATTERNS ▶ Over 50 modern plans and full size patterns. Racing classes, cruisers, inboards, outboards, sail boats. By famous designers. 6' to 30'. DESIGN CATALOG 35¢. Design Catalog and boat building handbook, $1.00

MARINE MART - DEPT 5 - BUFFALO 7, N. Y.

FREE! 10 HITLER STAMPS!

10 SCARCE STAMPS—ALL DIFFERENT—SENT FREE
TO SECURE NAMES FOR OUR MAILING LIST

MAIL coupon at once. We'll send you this fascinating set of 10 Hitler stamps. Different sizes, colors, values. NO COST TO YOU. Stamps were issued by short-lived nation of Bohemia-Moravia. Much sought after. Now becoming SCARCE. Our supply is limited. Don't ask for more than one set. We'll also include other interesting offers for your inspection—PLUS a FREE copy of our helpful, informative book, "How to Collect Stamps."

This special offer may have to be withdrawn soon—so rush coupon NOW to **Littleton Stamp Co., Dept. PS-7, Littleton, N. H.**

LITTLETON STAMP CO.
Dept. PS-7, Littleton, N. H.
Send me FREE the ten Hitler stamps and informative booklet, "How To Collect Stamps."

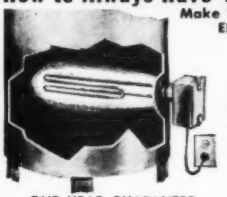
Name.....

Address.....

City.....State.....

If no dealer near you, write
O M Scott & SONS CO, 13 Fourth Street
Marysville, Ohio

How to Always Have HOT WATER



Make Your Own Automatic Electric Water Heater now for only $19.95

Install in 5 min. No disturbing or draining of tank or pipes

Why suffer without hot water? Enjoy lots of it to wash, bathe, shave. Heater keeps water HOT in your present tank. Turns ON when needed—shuts OFF when water is heated. No flue, dirt, fire!

Ideal for 30-gal. tanks. Heater screws into any size boiler tap as shown. Plugs into outlet . . . 1320 w. 110 v. AC. (also 2000 w. 220 v. model for BX cable $19.95) . . . works automatically thereafter. Temperature adjustable between 120 to 180 degrees. Replaces coal, oil, gas in home, store, summer cottage, green house, farm, barn, stock tank, poultry scalder, factory. Uses only 1½ to 3¢ electricity per gallon hot water. Why burn expensive main furnace unit for hot water? Send check or M.O. NOW—save postage charges. ORDER NOW . . . TODAY.

ONE YEAR GUARANTEE
U. L. Approved Heater

Money back in 10 days if not delighted.

COLLOID EQUIPMENT CO., INC. Dept. PS7, 50 Church Street New York 7, N. Y.

CARBURETOR TOO RICH MAKES MOTORIST TOO POOR

Car owners who are wasting money, getting poor gas mileage due to over-rich mixtures, will be pleased to learn how to save gasoline by **VACU-MATING OVER-RICH MIXTURES.** Vacu-Matic fits all cars, trucks and tractors. *Automatic* and operates on the supercharge principle. Easily installed in a few minutes.

SALESMEN WANTED! Big Profits

For FREE particulars, how you can install one on your own car for introducing, just send your name and address on a postcard to **VACU-MATIC, 7617-1919 W. State St., WAUWATOSA, WIS.**

GROW MINIATURE TREES
FOR PROFIT & PLEASURE

Fabulous Money—Real Fun! Grow *genuine live* dwarf (Ming) trees. A terrific new business and hobby. Astounding details Free. Write—

DWARF TREES, Dept. 12
P. O. Box 355 · Briggs Station
Los Angeles 48, California

WARN HUB CAP MAKES 2 JEEPS OUT OF 1

$20.00 Prepaid U.S., Canada

Ends front wheel drag on 4-wheel drive Willys Station Wagons, Pick-ups and Jeeps

Saves gas up to 5 miles per gallon, tire wear, front axles, increases speed and power. Stops shimmy from wheels coast out of gear! 4-wheel drive handles, performs, climbs like 2-wheel. Install or remove WARN HUB CAPS in 10 minutes. Polished aluminum, guaranteed. Rush check, M.O., or C.O.D. Write for circular.

WARN MFG. CO. P. O. Box 6064-B Seattle 88, Wash.

ATTENTION RESCUE SQUADS!

The latest in body recovery! It's new! It's different!

This patented De Groot submersible drag is made of an air-tight metal tube with adjustable weights at each end, thereby regulating the distance of the drag hooks from the bottom surface. Snagging of foreign materials is reduced to a minimum because the grappling hooks do not come into contact with the bottom surface. Complete descriptions and information available without charge or obligation.

John De Groot, 1714 Brewster St., Peru, Illinois

CAR OWNERSHIP COSTS LESS WITH A HULL AUTO COMPASS

IT'S EASY to make a wrong turn without a Hull Auto Compass, drive blocks or miles before getting straightened out. Wasted miles add up amazingly . . . which is why a Hull Auto Compass pays for itself over and over. Write for local dealer's name, free literature.

MORE HULLS IN USE THAN ALL OTHERS COMBINED

HULL MFG. CO. P. O. BOX 246-E7 WARREN, OHIO

Beaconlite illuminated $6.95
STREAMLINE standard not illu. $4.95

FUN FOR EVERYONE!

The Easy Way to Build Your Own OUTDOOR FIREPLACE

Food Cooked Outdoors Tastes Better . . offers real enjoyment for the entire family . . . perfect for entertaining guests! It's easy and economical to build your own Cook Nook. Just add the masonry (any design you prefer) around the Majestic all-metal unit and start cooking! See your dealer today or send check or M. O.

Model OF-28 21" x 26" x 13½" **only $20.95**

SEND FOR free DESIGN BULLETIN! Big Selection of easy-to-follow designs

The Majestic Co.
401 Erie St., Huntington, Ind.

WORLD'S FASTEST BOATS!

Send 25c today for **Illustrated Catalog** of **Champion Racing Hydroplanes, Utilities, 3 Points,** 7 to 17 ft. lengths. Easy to follow **Plans** $8.75 up; complete **Kits,** $120 up, custom built **Speedboats** from $210. **CHAMPION BOATS,** 1524 W. 15th St., Long Beach 13, Calif. Dept. 18-T.

MODERNIZE YOUR GUN WITH *Franzite* GRIPS

IMPROVE YOUR SCORE

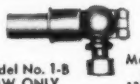
Franzite Grips are positively unbreakable — most durable made. Offered for Colt, Smith & Wesson, Hi-Standard, Ortgies, Luger, Mauser, other domestic and imported guns. Wide choice of smart designs in Ivory, pearl, walnut, onyx, agate, black and a few target, staghorn and carved grips. Low prices! FREE NEW CATALOG. Dealers wanted.

SPORTS, INC. (MFRS.) 5501 Broadway, Dept. BK-7, Chicago, Ill.

FAMOUS Battle Saber

WINFIELD ARMS CORPORATION
409 East Pico Blvd., Dept. F-7, Los Angeles 15, Calif.

BULL DOG HITCHES



Heavy Drop Forge Steel Construction. Strong — Safety-Engineered Reliable

Model No. 1-B
NOW ONLY
$4.95
Post Paid (when paid in advance)

Made for trailers with up to 2,500 pounds capacity.
1⅜" dia. shank — Fits 1¼" pipe tongue

HAMMER BLOW TOOL COMPANY
Wausau 14G, Wisconsin

Crusade PISTOL CROSSBOW

Silent, accurate, powerful. 30 lb pull. Fun and easy to use

PRECISION MADE

KILLS SMALL GAME

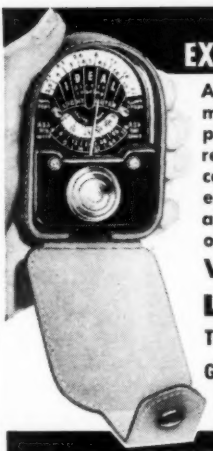
only $4.95 with 3 arrows

This **HEAVY DUTY WEAPON** made for hunting and target. Amazing new metal alloy 2 ft. spring bow permits powerful shooting. Beautiful 18" hand finished hardwood stock. Shoots over 300 ft. Beginners shoot more accurately than professional archers.

MONEY BACK IF NOT COMPLETELY SATISFIED

Includes 3 arrows, target, instructions. Send $4.95 to **TECHRITE CORP., Dept. F, , Box 12, South Pasadena, Calif.**

"IDEAL" EXPOSURE METER



Accurate photo-electric light meter, for perfectly exposed pictures. Reads directly in "f" stops, — no calculating. Simple, quick, easiest to use. For all movie and still cameras, regular or color film.

With DROP-FRONT LEATHER CASE

THREE YEAR GUARANTEE **$9.95**

"IDEAL" RANGEFINDER

Precision optical instrument shows exact distance for perfect focusing and clear, needle-sharp pictures. Just look through finder and turn knob until double images come together. Specify metric or feet scale.

THREE YEAR GUARANTEE **$2.95**

AT YOUR DEALER
Or Send Check Or Money Order Direct. WE PAY POSTAGE

FEDERAL INSTRUMENT CORP.
Dept. PS7
14-02 Broadway, L. I. City 6, N. Y.

FREE!

New Johnson Sea-Horse Handy Chart. Describes, in detail, the four great Johnson outboard motors for 1952 — from 3 hp to 25 hp. A size for every outboard need — from canoe to cruiser. Write!

JOHNSON MOTORS, 500 Pershing Rd., Waukegan, Ill.

GIANT BALLOONS

Genuine govt. surplus weather target balloons. For fun or profit. Great sport in the back yard; or for parties, picnics, dances, fairs. Money-makers whenever you want to attract a crowd for lodges, civic events, school functions, conventions, exhibitions, trade shows. Special purchase makes these low prices possible.

3 Ft. Dia. **39c** — 6 Ft. Dia. **79c** — 13 Ft. Dia. **$1.39**

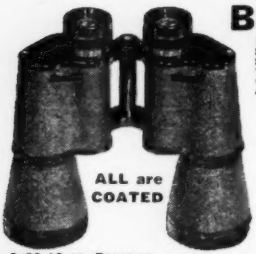
AQUA GOGGLES

Be a **frog-man,** double your swimming fun. See the many miracles of the deep. With underwater "clear vision" you can play tricks on your friends. These same goggles used by pearl divers, marine observers, distance swimmers. Large glass lens, vacuum fit, adjustable for comfort. Protection against chlorine and salt water. Natural sea-green rubber. **only** **$1.25**

JR. GOGGLES, same as above, plastic lens **79c**

Add 10% for postage and handling
California residents please add Sales Tax

WAR ASSETS DIV. VOLUME SALES CO.
Dept. S-7-52, 3930 Sunset Blvd., Los Angeles 29, Calif.



BARGAINS

Brand New, top quality glasses. All have precision ground optics, durable lightweight bodies. Moisture and dust proofed. Color corrected Achromatic lens.

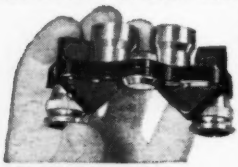
Coated! Featherweight!

16x50 COATED $66.95

The ultimate in a fine binocular. Tremendous power. **Featherweight** (weighs only 25 ounces!). Precision made in every detail. COATED providing sharper, brighter images. Individual focus. Objective lens is 50mm (2 inches) across!

6x30 16 oz. Economy	$27.95
7x35 All around use	42.95
7x50 31½ oz. Sharp, bright, Bargain.	36.00
7x50 Center Focus, Sale priced	39.50
8x30 17 oz. Clear, crisp	32.50
8x30 Center Focus	37.50
8x40 Streamlined	51.50
10x30 18½ oz.	39.50
10x50 35 oz. More Power	62.00
12x50 35 oz. Reaches out	65.00
12x50 Center Focus. 25 oz.	67.50

6X-10X POCKET ALL 3 ARE COATED, precision PRISM Binoculars. Superb craftsmanship.



10x They Are News $24.95
WEIGHS 7½ OZ.! Palm sized. Full 10 Power. Color corrected. Achromatic lens. Perfect balance. Another UNITED first in revolutionary binocular development.

6x DUO-TONE $16.95
Illustrated. Weighs only 4 oz.! Yet has field of 375 ft. at 1000 yds.!

7x ALL CHROME $21.95
Sturdy. Precision made. Sharp, clear vision! Sale priced.

SIX TELESCOPES IN ONE! **$30.75 COATED**

15to40 POWER

American made Wollensak telescope. Instant focusing at 15x, at 20x, 30 and 40x, etc. Turn power tube to click—no guess work. Telescope measures 9" closed, 27" when extended. Weighs only 18 oz.! Has rust proof chrome tubes. Large 40mm objective lens. All 12 optic surfaces are COATED. See .22 bullet holes clearly at 300 feet. Use also for astronomical observation. $30.75 price **includes** tax and fine leather case. All binoculars bear the UNITED **"Seal of Quality"**. Proof they are the BEST-BY-TEST.

UNITED SEAL OF QUALITY

UNCONDITIONALLY GUARANTEED!

30 DAY FREE TRIAL

If not fully satisfied return for full refund! Cash orders rushed postpaid. On C.O.D.'s include $2.00 deposit. Add Federal Tax. Prices on all of above include handsome genuine leather case and straps. **UNITED BINOCULAR CO.**, 9043 S. Western, United Bldg., Dept. ARF-6816, Chicago 20. **Display Sales Rooms open 9:00-3:30 Mon. thru Fri. DEALERS WANTED**

the sportsman's
CROSSBOW
tremendous power, accuracy for hunting and target 45–65 lb. pull

Old Weapon—New Sport. Superbly crafted, 1-1/2" x 29" hardwood stock, precision steel trigger mechanism, highly tempered steel bow—arrows. Aims and hits like rifle. Not a toy. Will kill deer. Real thrill and excitement.

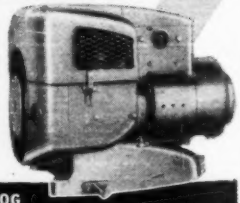
$14.95 postpaid

KENRON PRODUCTS • Room 152
840 E. Washington St., Pasadena, Calif.

ELECTRICITY *Anywhere*

FOR PORTABLE, EMERGENCY OR HOME USE

ONAN Electric Plants generate 110-volt, 60-cycle current for homes, farms, cabins and resorts beyond the highline. Lightweight, portable plants cut costs, speed work for contractors. Standby plants protect hospitals, homes, civil defense units against power failure. 400 to 55,000 watts. Gasoline or Diesel-powered. Priced from $219.00.



WRITE FOR CATALOG

D. W. ONAN & SONS INC.
6741 UNIV. AVE., S.E., MINNEAPOLIS 14, MINNESOTA.

ELECTRONIC WALKIE TALKIES

- **TWO WAY.** Set consists of two (2) "transceivers" ready to hook up. No license needed! Simply attach wire coil (included in each set) to terminals and talk between any two points. Operates anywhere Clear voice transmission guaranteed
- **BROADCAST OVER HOME RADIO.** Either or both Walkie-Talkies can be hooked up so you can "broadcast" from your own radio speaker. Mystify your friends—plan your own radio programs and announcements
- **RECEIVE LOCAL BROADCASTS.** Your Walkie Talkies can easily be converted to the broadcast band and thus serve as your own private radio receiver. The REMCO plug in crystal adapter and special aerial attachment will permit reception on broadcast frequencies. Adapter and aerial attachment only $1.98 (Optional). Sets are ruggedly constructed of high quality injection molded plastic engineered for utility and extra long service. This is not a kit but a genuine communication system. Guaranteed—or your money refunded in full. Send check, cash or money order. For C.O.D. orders enclose $1 deposit.

only $3.49 postpaid 2 SETS COMPLETE

EMPIRE MDSG. CO. Dept. P
63 Central Avenue, Ossining, N. Y.

BOAT WORRIES? FIBERGLASS YOUR BOTTOM

FIBERGLASS your own boat, easily, at low cost. Save your old rowboat—protect your new cruiser. End boat upkeep, sure-cure for hull problems. Adds strength, speed. 100% watertight, ends caulking, painting, hull upkeep. Rot-proof, worm-proof, weather-proof. Almost indestructible, lasts lifetime of the boat. Simple instructions give new easier method of applying, how to add permanent fade-proof color. FIBERGLASS patching kits now available. Write today for free booklet of information—cost, application, how to order, etc.

Stanford's Fiberglass Co. Dept. P1, 1412 W. Burbank Blvd. BURBANK, CALIFORNIA

Mustang **LIGHTWEIGHT $370.00** (Fed. tax paid, at factory)

9.5 hp. 4-cycle. 3-speed. Foot-shift. Over 70 miles per gal. Over 60 m.p.h. Write for free circular.

MUSTANG, Dept. P5
635 W. Colorado, Glendale 4, Calif.

MODEL OUTBOARD MOTOR!

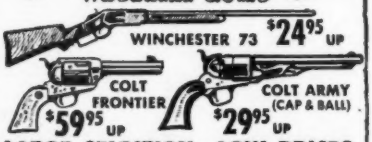
IT REALLY RUNS!

Electric outboard gives model boats real speed. Works on 3 to 12 V. flashlight batteries. Weight 5½ oz. Only 4⅝" high. Has adjustable rudder, D.P.D.T. Switch for neutral and direction control. Sturdy metal construction. Money-back guarantee. Act now. Supply limited. Send check or M.O.

$3.95 IN U.S.

LES MYERS, Inc. 21 S. 16th St. Philadelphia 2, Pa.

WESTERN GUNS



WINCHESTER 73 $24.95 UP

COLT FRONTIER $59.95 UP

COLT ARMY (CAP & BALL) $29.95 UP

LARGE SELECTION—LOW PRICES
Complete Stock of Western Weapons and Accessories
Send 50c for 84 Illustrated Collectors Catalog
Gives Complete Details & Prices on all Items • Catalog Price Deducted from First Purchase

WESTERN GUNS 7517 MELROSE AVE. Dept. I HOLLYWOOD 46, CALIF.

Just 1 Hair Tonic Gives You Handsomer Hair 3 Ways

Grooms Hair Perfectly!

Lucky Tiger grooms your hair the light, natural way—keeps your hair in place, yet not the least bit greasy.

Relieves Dryness and Itching

Lucky Tiger 3-Purpose Hair Tonic kills the germ Pityrosporum ovale, a common cause of infectious dandruff.

Fights Dandruff

It routs embarrassing loose dandruff and cleanses your scalp—gives it a cool, clean feeling.

Get YOUR Pin-Up!

Here's How! To get a beautiful, full color 8½" x 11" reproduction of the Lucky Tiger Girl, just fill out the coupon and mail it in. We would appreciate your enclosing a Lucky Tiger box top, but it's not a must. A valuable coupon will be included with your pin-up.

Send In Today—Our supply of Lucky Tiger Pin-ups is limited, so act now.

Get Your Lucky Tiger At Any Toilet Goods Counter —Small Retail Size Bottles At Barber Shops.

LUCKY TIGER
3-Purpose Hair Tonic

She's YOURS for the Asking!

LUCKY TIGER MANUFACTURING CO., Dept. P.S.
2901 Fairmount Ave., Kansas City 8, Missouri

Gentlemen: Please send me postpaid a beautiful Lucky Tiger Pin-up. I am / am not enclosing a box top.

NAME_____

ADDRESS_____

CITY_____ STATE_____

A bit about "Bite"

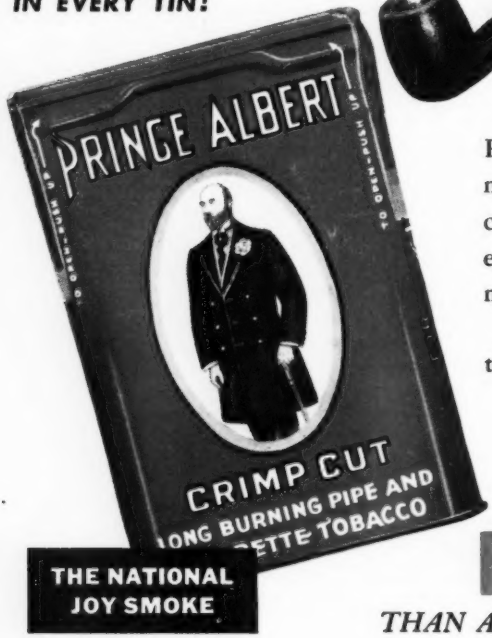
WITH FISHERMEN, the more "bites"—the better! When fighting fish smack their lines—it's a thrill!

WITH PIPE SMOKERS—the *less* "bite" the better. Prince Albert is specially treated to insure against tongue bite!

R. J. Reynolds Tobacco Co., Winston-Salem, N. C.

Bite's Out Pleasure's In

THERE'S MORE TOBACCO IN EVERY TIN!



Prince Albert is made to give you more smoking enjoyment. P. A.'s choice tobacco is treated by the patented* "No-Bite" process which means more *real* smoking comfort.

Great for "makin's" cigarettes, too! Buy P.A. today!

*Process Patented July 30, 1907

THE NATIONAL JOY SMOKE

MORE MEN SMOKE

PRINCE ALBERT

THAN ANY OTHER TOBACCO

POPULAR SCIENCE
REG. U. S. PAT. OFF. Monthly

Triangles to Stop the Big Bombers

Fast, agile delta-wing fighters are our ace in the hole against the atom-bomb carriers.

By Andrew R. Boone

KOREA has proved that we need faster, more maneuverable, more deadly fighters and interceptors. They can't be just as good as the enemy's if we want control of the air. And control of the air is something you either have or you don't have. We have not had it in Korea. We must have it here at home to parry any thrust of enemy jet bombers *before* they can lay their A-bomb eggs on our cities.

Once jet power promised to give it to us. But jets weren't enough. Then came the swept wing of planes like the F-86 Sabrejet. They did better along Mig Alley.

Now we have swept back the wings even more and are building flying triangles.

Farthest along of these still-experimental planes is Convair's XF-92A, pictured above. Resembling a child's schoolroom paper dart in shape, its wings are swept back 60 degrees along the leading edge, forming a triangle with equal sides. (Such a triangle also forms the Greek letter delta, hence the

Delta wing in flight above is Convair XF-92A. It has afterburner that adds considerable thrust

name "delta wing.") But why are we building a flying triangle?

● It flies faster with equal power because there is less aerodynamic drag. Then there's another factor. As a plane flies fast, it encounters a shock wave that forms a narrowing cone. The delta wing, because it can be swept farther back, fits into this cone much as a finger fits into a glove. The XF-92 already has flown faster than sound, and speeds of 1,500 miles an hour are predicted by some experts for this type of aircraft.

One disadvantage of the delta wing is that it has high drag at low speeds. The more powerful jet engines we are producing will take care of this. And there is compensation and more in its efficiency at speeds approaching sound. It really pays off at the

BRITISH are in the delta-wing act, too. Of twin-engined Gloster GA-5 (above), they say: "It is better qualified than any other aircraft to destroy atom bombers from any country..."

to the triangle's Allison turbojet engine.

supersonic speeds at which it will fight.

● Its maneuverability, especially at high altitudes, makes all Air Force pilots who have checked out in the F-92 triangle-happy. Says Maj. Charles E. (Chuck) Yeager, "The delta can outturn practically any airplane *at any altitude*." Chuck should know. He pioneered faster-than-sound flight and has flown them all.

● Flight stability is another virtue of the delta form. That means a better gun platform, which means deadlier accuracy in throwing bullets and rockets at an enemy.

Outstanding in speed, maneuverability and destructive power, the dartlike shape has still more on the ball. It handles as easily as its more conventional jet brothers. It cannot be stalled. It makes the once-dreaded transition from subsonic to supersonic flight without buffeting or control conniptions.

Its larger wing area provides increased lift and more space for fuel without resorting to external tanks that cut down speed. And the elimination of a tail section makes for a simpler design, saving production time.

Contracts Have Been Signed

All these performance and design characteristics have been proved in extended flight tests of the F-92 over the California desert. As a result, both the Air Force and the Navy have been sold on the delta wing to the extent of ordering several air-frame manufacturers to design other flying triangles. They are on the secret list.

As for the XF-92A, it has just about done its job as a research model. It will be followed by the XF-102. A production contract has been awarded Convair, with expectations that the first Flying Triangles will see service with fighter squadrons in two years.

And a good thing. The Russians are reportedly developing a delta wing. END

NOT A TRUE DELTA WING because it is not an equilateral triangle, Douglas XF4D is Navy's entry. It is claimed to be fastest-climbing, highest-flying interceptor in the air.

Phone Doesn't Ring—It Taps

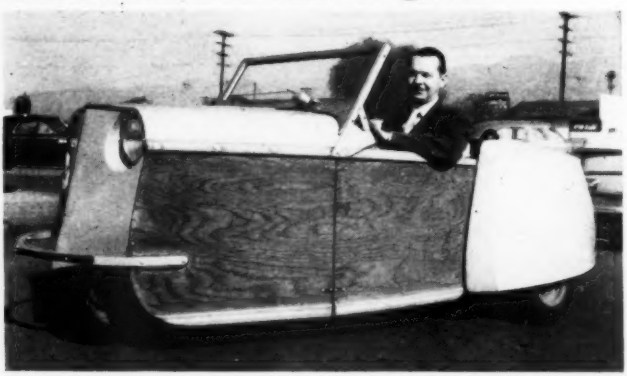
A SOLDIER 'way out in front won't call down enemy fire when this new Army field phone "rings." It signals incoming calls with a tapping that sounds like a woodpecker. Adjustable for volume, the tapping can be heard more easily than a bell and twice as far, even in battle noise. The phone normally works on two flashlight batteries but will transmit five miles on just the power of the speaker's voice.

Windmill Power Operates Signal

A WINDMILL generator, atop the nearest pole in the photo above, charges a storage battery that works a signal beyond. This dispenses with a lengthy power line for the purpose. The idea helped to save 20 miles of electric wire in installing a pair of signals on the Chicago and Eastern Illinois Railroad, at a junction 90 miles south of Chicago, and eliminated trouble with long overhead wiring from wind and sleet.

"Fill 'Er Up" Puts 1½ Gallons of Gas in Featherweight Car

THIS homemade three-wheel car cost Walter H. Korff of Burbank, Calif., just $250 to build. Its plywood body has room for the driver and one passenger. The midget vehicle weighs only 684 pounds and consumes so little fuel that a 1½-gallon gasoline tank is big enough. Capable of 50 m.p.h., it has an 8¾-hp. engine.

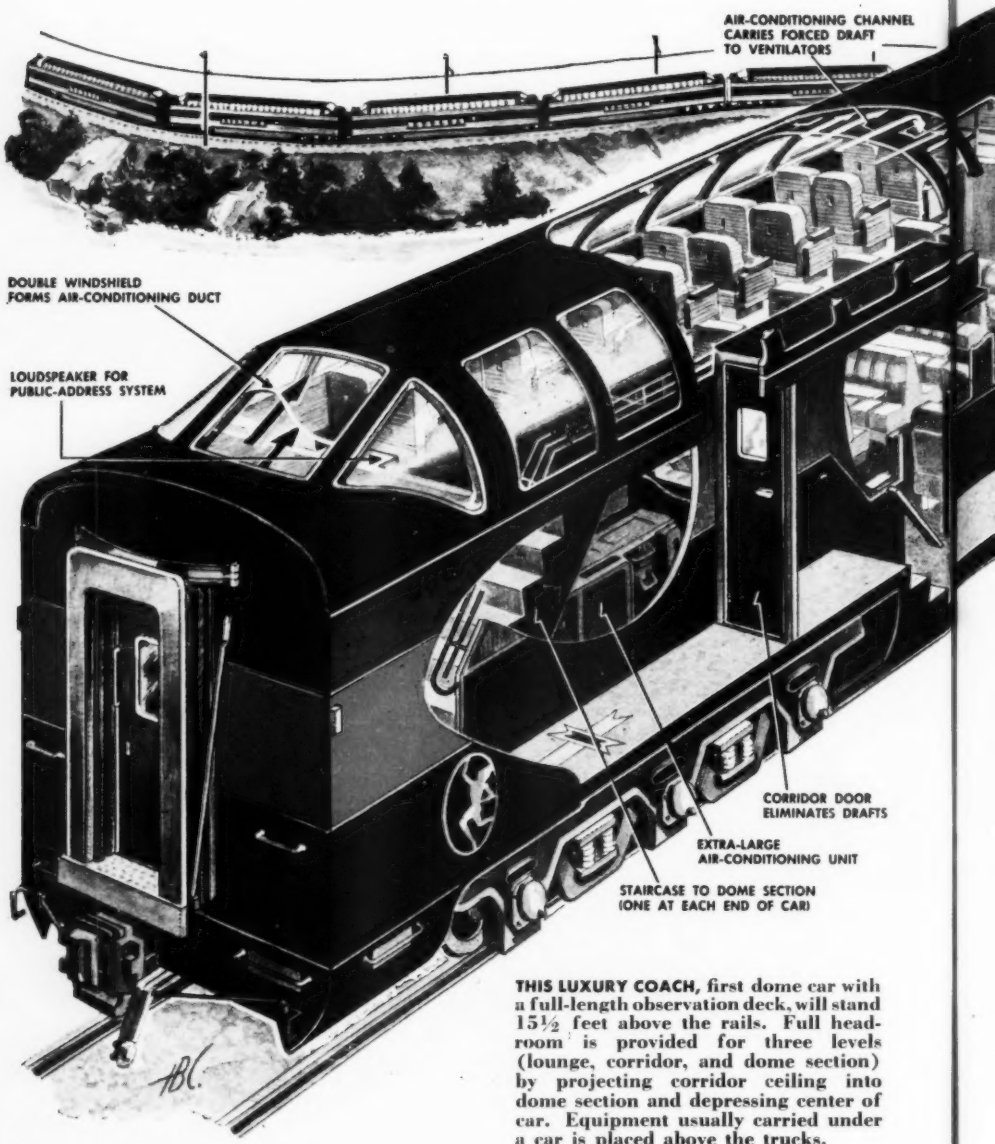


Gun-Toting Car Goes 70 M.P.H. Forward or Back

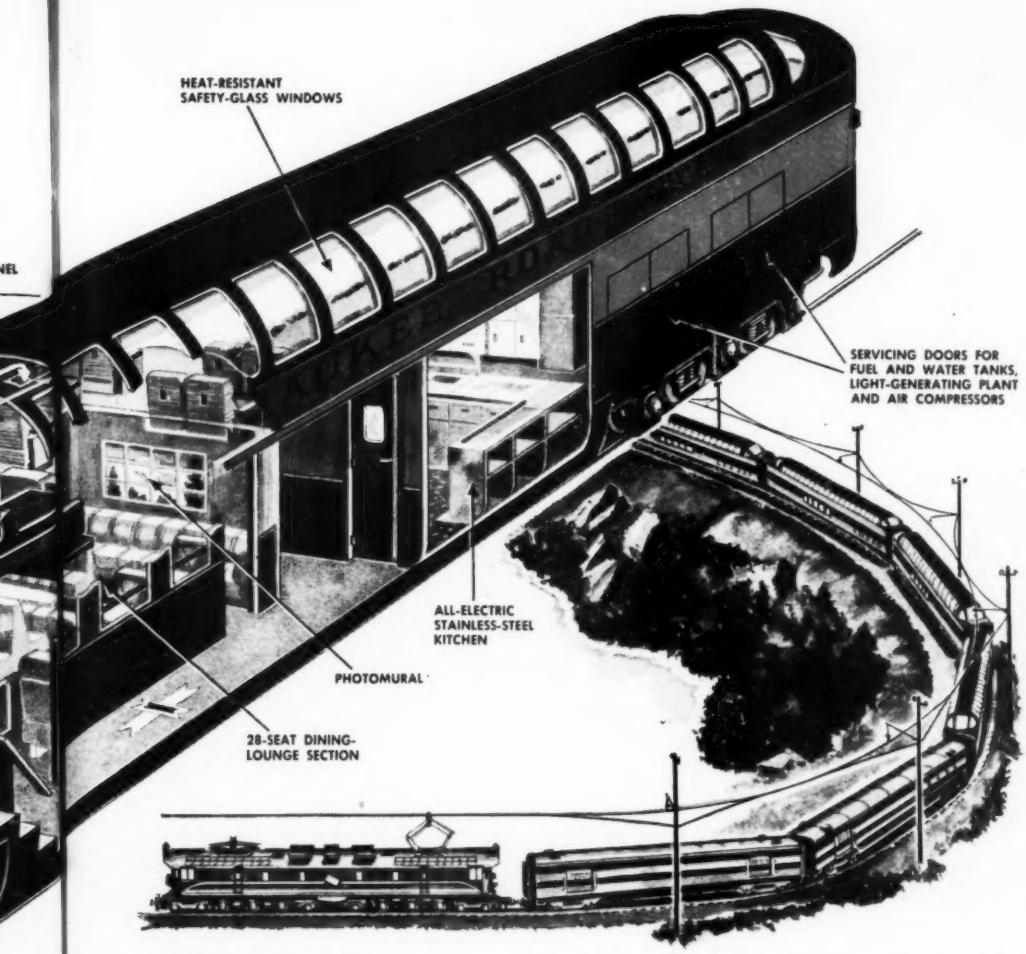
TWO drivers face in opposite directions in this new French armored car. A flick of a lever transfers control from one to the other, enabling the 13-ton machine to dash forward (below) or backward (above) without turning. Designed for reconnaissance, the 70-m.p.h. car is armed with a 75-mm. cannon and three machine guns.

Super Dome Cars

Will Carry 68 Upstairs



THIS LUXURY COACH, first dome car with a full-length observation deck, will stand 15½ feet above the rails. Full headroom is provided for three levels (lounge, corridor, and dome section) by projecting corridor ceiling into dome section and depressing center of car. Equipment usually carried under a car is placed above the trucks.



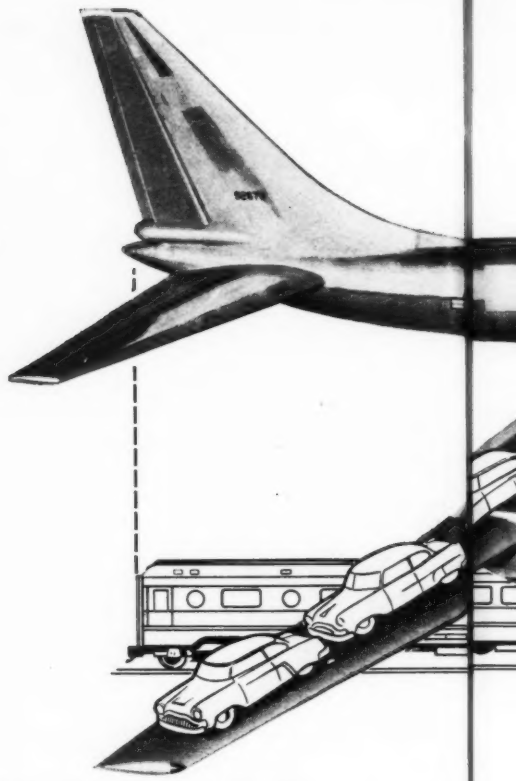
By Henry B. Comstock

RAILROAD travelers like watching scenery from the glass-roofed "dome" cars too much—there isn't enough room upstairs for all who want to sit there. Now a new model will solve this problem with a full-length observation deck providing a seat-with-a-view for every passenger. Downstairs, a luxurious diner-lounge will be served by an all-electric kitchen. Pullman-Standard is making 10 of the cars for the Milwaukee Road.

To beat the summertime heat in the huge double-glazed dome section, an air-conditioning unit twice the size of standard car-cooling plants is being placed in one end section. Cold air will be blasted upward between two panes of glass forming a double windshield at one end of the car, then carried through a channel in the roof. Outlet ports deliver a controlled supply at intervals along the 73-foot glass top.

Sky-gazers will have little to fear from falling rocks and ultraviolet rays. The three-by-five-foot, curved dome windows are to be made of half-inch-thick, tinted safety glass. Through them, travelers will be treated to a bigger and better view of the scenery—the Bitter Roots, Rockies and Cascades from the Olympian Hiawatha, to which six of these cars will be assigned; and the upper Mississippi Valley from the Morning and Afternoon Hiawathas, each of which will rate two cars. Loudspeakers will announce points of interest. END

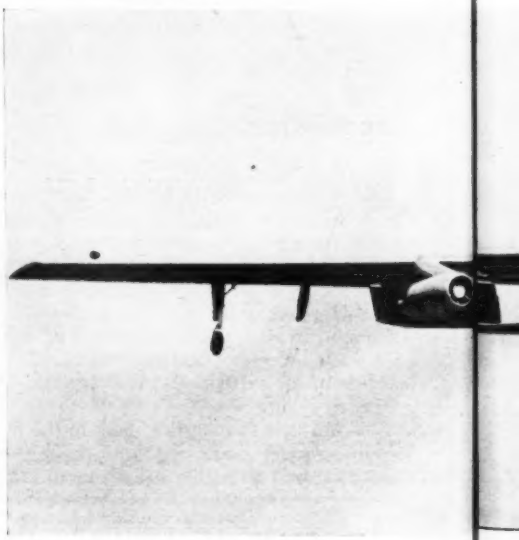
U.S. Unwraps Jet Giants

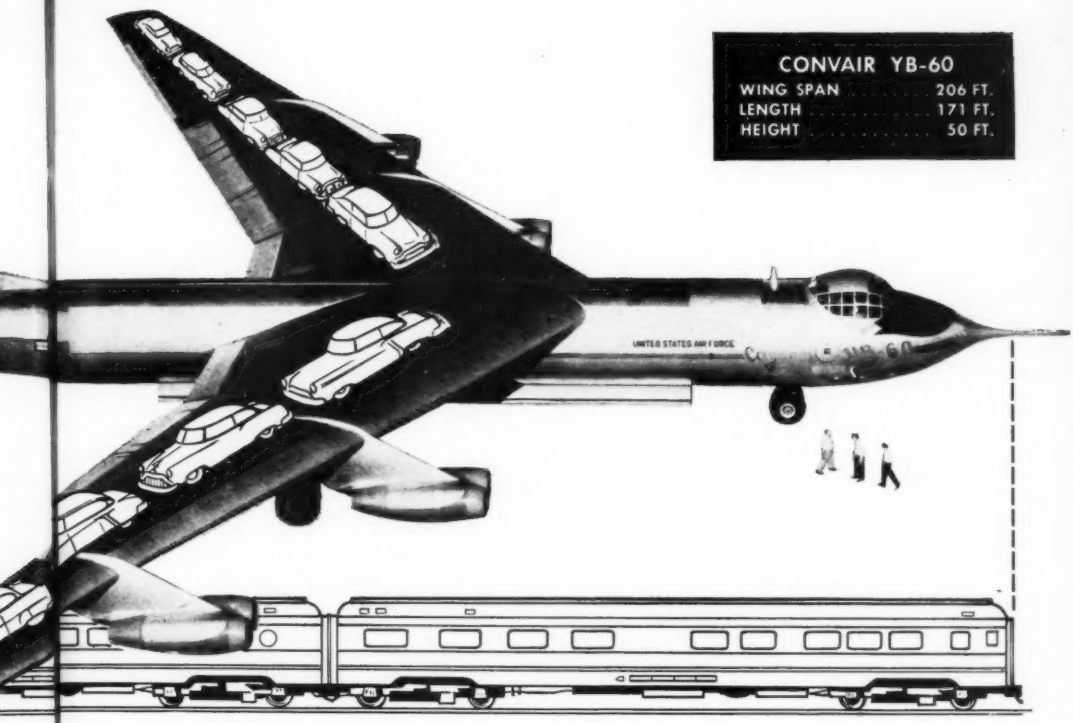


THEY are big—these two new, jet-flown Air Force weapons designed for global, atomic war. Five automobiles could be parked, with room to spare, on each wing of the Convair YB-60. The world's largest bomber, it's as long as two railroad coaches. For a more personal comparison of the bomber's size, study the three men who are standing near the nose at far right. They're not midgets.

The Boeing XB-52 Stratofort (lower photo) is somewhat smaller but still impressive. Each plane has eight of our latest turbojet engines. Both planes are powerful and can climb rapidly to an altitude of 40,000 feet. They've got global range—10,000 miles is estimated. And they're fast—perhaps exceeding the speed of the six-jet B-47, up to now the world's fastest bomber, which has crossed the continent at an average speed of 607 miles an hour. And they might carry their own fighter escort, released in flight the way the F-84 Thunderjet was recently launched experimentally from the belly of a piston-jet B-36, our biggest operational bomber.

When they join our Air Force—production has been ordered on the B-52—these two swept-wing giants are expected to give us a decided advantage over the Russians in strategic bombing. Latest intelligence credits the Soviet Union with only one long-range bomber—the piston-engined Tu-4, a copy of our wartime B-29 Superfortress. In jets, the Russians have a twin-engine medium, the Tu-10. But neither has the necessary long range combined with speed to evade or outdistance interceptor jets of a defending nation.



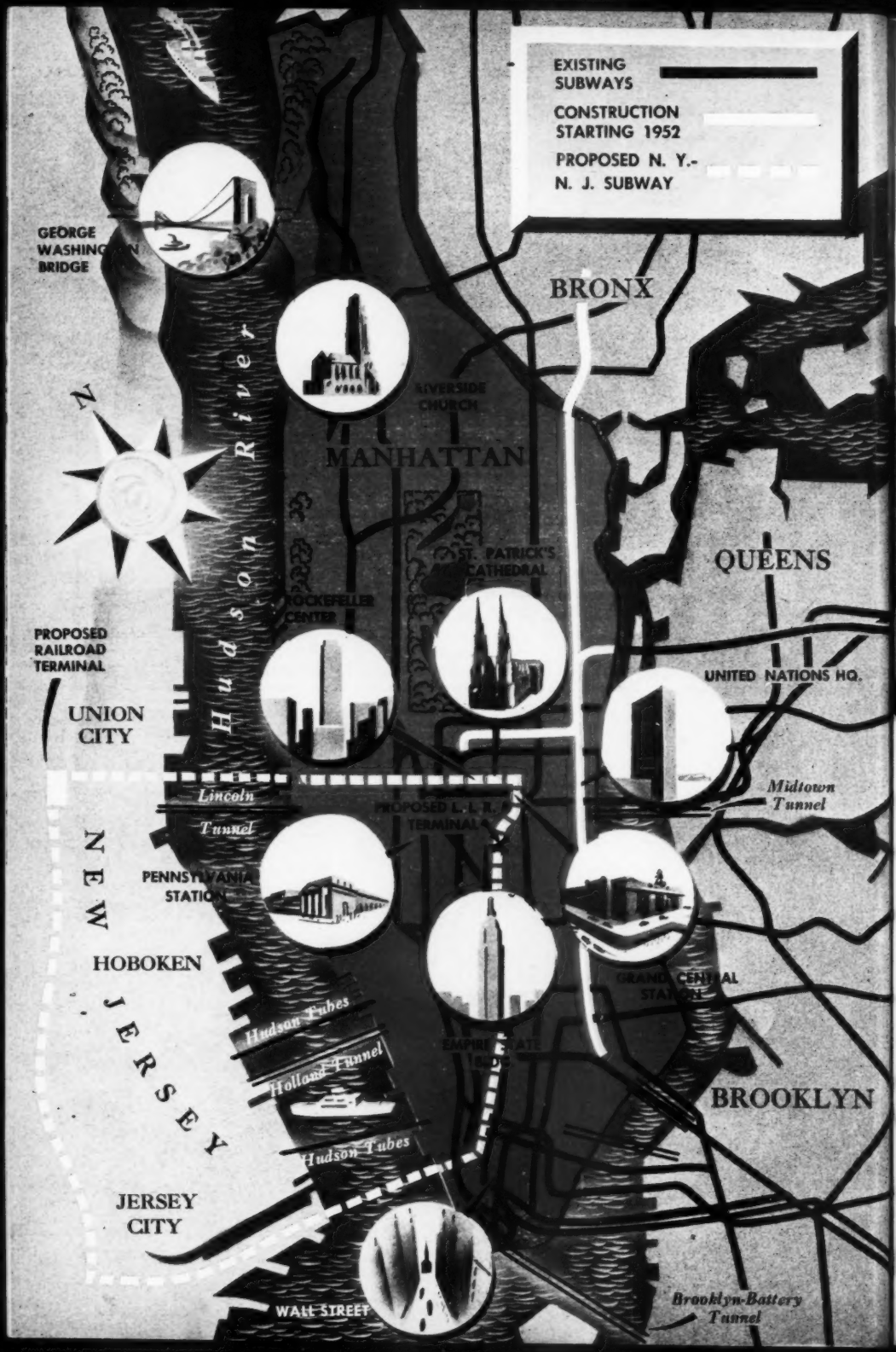


CONVAIR YB-60

WING SPAN	206 FT.
LENGTH	171 FT.
HEIGHT	50 FT.

BOEING XB-52

WING SPAN	185 FT.
LENGTH	153 FT.
HEIGHT	48 FT.


EXISTING SUBWAYS
CONSTRUCTION STARTING 1952
PROPOSED N. Y.-N. J. SUBWAY
GEORGE WASHINGTON BRIDGE
BRONX
RIVERSIDE CHURCH
MANHATTAN
Hudson River
N
ST. PATRICK'S CATHEDRAL
ROCKEFELLER CENTER
QUEENS
PROPOSED RAILROAD TERMINAL
UNITED NATIONS HQ.
UNION CITY
Lincoln Tunnel
PROPOSED L. I. R. R. TERMINAL
Midtown Tunnel
NEW JERSEY
PENNSYLVANIA STATION
HOBOKEN
GRAND CENTRAL STATION
Hudson Tubes
EMPIRE STATE BLDG.
Holland Tunnel
BROOKLYN
Hudson Tubes
JERSEY CITY
WALL STREET
Brooklyn-Battery Tunnel

The Great Subway Maze Is Still Growing

By Wesley S. Griswold

More subways will be welcome relief to "regulars," caught twice a day in a mighty squeeze.

New tunnels will soon carry more tracks and trains under Manhattan—but seats will still be scarce.

THE biggest underground railroad in the world isn't big enough.

If you could make a single, straight track of New York's 239 miles of subway lines, it would reach from New York to Alexandria, Va. Yet work is to begin this summer on a new line that will add 29 miles more, extending beneath Second Avenue from Manhattan's lower East Side, past the gleaming United Nations Headquarters and the fashionable East River residences uptown, to connect with existing lines in The Bronx.

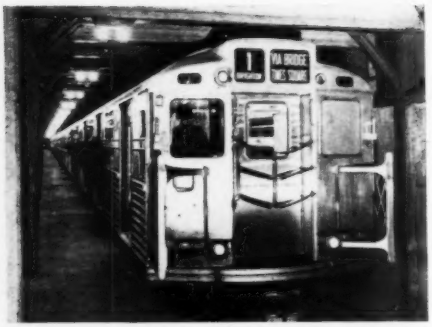
WHERE YOU CAN GO ON A DIME. Someday New York City may have, in addition to the Second Avenue subway for which excavating is about to begin, a new underground line linking it with New Jersey, which funnels more than 185,000 commuters into Manhattan daily.

EDITOR'S NOTE: ***Visitors to New York find one of the city's most amazing sights beneath the streets, in the city's gigantic subway. No other transportation system hauls—and mauls—so many people so far so fast. Even those who ride it regularly get lost regularly in its 13,000 trains and 500 stations.***

But even this will be only the beginning of a new expansion program.

Every weekday, more than 13,170 subway trains travel under New York streets. It would take every last locomotive on the Chesapeake & Ohio, Baltimore & Ohio, Denver & Rio Grande Western, Southern Pacific, Chicago & North Western, Missouri Pacific, New York Central and Northern Pacific railroads to haul that many trains.

From Monday through Friday, the New York subways daily carry more than 4,700,-



NEW SUBWAY TRAINS will probably look a lot like this one, built for New York in 1949. It is made of stainless steel and has both vertical and horizontal shock absorbers.

STATION CALLS, rarely heard on older trains, are made over a public-address system on the latest-type subway. Conductors also use the device to direct and caution riders.

MORE ROOM TO STAND is a feature of New York's newest subway equipment, in which the lighting is fluorescent, the air sterilized and the dust removed electrically.

000 passengers, as many people as live in Arizona, Colorado, Idaho, Montana, Nevada, New Mexico and Utah combined.

Yet long-range planners are seriously considering proposals to lure a lot more people into traveling to and from Manhattan Island underground. One plan calls for building a beltlike subway connecting New Jersey railroads with certain key points in New York City. This subway would require two tunnels under the Hudson River and a new route under the city from the Radio City area to the lower tip of the island.

Fastest Subway in the World

Of the 17 subway systems in the world, New York's is the fastest, running a train every two to four minutes during peak traffic hours. (Rome's is the slowest, sending a train threading its way among the foundations of two-thousand-year-old buildings every two hours.) Except in case of an occasional breakdown, passengers on the main routes are never kept waiting more than 20 minutes for a train, even during the middle of the night.

The New York subways have a rolling stock of 6,800 cars, more passenger cars than the Kansas City Southern, Illinois Central, Great Northern, Santa Fe, Union Pacific, Atlantic Coast Line, Southern and Wabash railroads could muster altogether.

Subway trains are made up of from three to 10 cars, each one regularly inspected every 1,000 miles, and are not allowed to travel faster than 50 miles an hour. Over 3,500 motormen drive the trains, and 4,344 conductors control the car doors, taking care not to leave any arms or legs sticking out as each train departs from a station.

More than 260 dispatchers and as many more assistants control subway traffic, following the progress of trains between stations by means of consecutively flashing lights on control boards.

Cheapest Train Ride on Earth

Of New York's 500 subway stations—nearly as many passenger stations as the world's largest surface railroad, the Pennsylvania, has along its 25,000 miles of track—the busiest is at Times Square, center of the theater district. More than 48,000,000 people, as many as there are in the entire South, passed through its turnstiles last year.

Most of the subway stations are only about one story below the sidewalks, and strollers above can often feel the rumble of

HEADED FOR NEW YORK STREETS. The biggest U.S. city, plagued by traffic snarls, may have to build still another subway and try to get these people to use it instead of their cars.

passing trains in the soles of their feet. One station, however, is 184 feet below the street, a distance equivalent to the height of a 14-story building.

Though the cost of riding on the New York subways rose from a nickel to a dime in June, 1948, they still provide the cheapest long-distance train ride on earth. For 10 cents a passenger can travel 23¼ miles, in 74 minutes, without having to change trains. The outermost points of the huge underground railroad are 27.27 miles apart.

Brother, Can You Spare 700,000 Dimes?

It is a long-standing, sour joke among New Yorkers, grateful as they are to be able to ride so far for so little, that their subways always run at a loss. For instance, in the six months ending December 31, 1951, though the subway system had collected nearly $75,000,000 in fares—considerably more than the U. S. Treasury collected in taxes in any year prior to the Civil War—it was already more than $7,000,000 in the red.

Passengers who dropped slugs or foreign coins into the subway turnstiles—one in every 26,500 fares—were a minor source of financial loss. The city's Board of Transportation used to dump this dubious revenue periodically into New York Harbor. Last December, however, it finally recouped some of its loss. It sold 37,803 coins from 29 foreign countries to a Broadway dealer for about $1,700.

A much more impressive source of income for the New York subway system is its slice of the sale price of all goods and services provided on hundreds of its station platforms. Here passengers can buy peanuts, candy bars, packaged crackers, chewing gum and soft drinks from vending machines; purchase flowers, bakery products, mixed nuts, boxes of candy, books, magazines, newspapers, and complete light lunches from shops and stands; have their shoes shined; store their packages in coin-operated lockers; and avail themselves of pay phones and pay toilets. From this commercial hurly-burly the city in 1951 extracted slightly less than $5,000,000.

Naturally, the discarded wrappings, abandoned newspapers and wads of gum left in the wake of subway riders pose a major housekeeping problem. Thousands of waste-

[*Continued on page 214*]

TV Checks Names on Checks

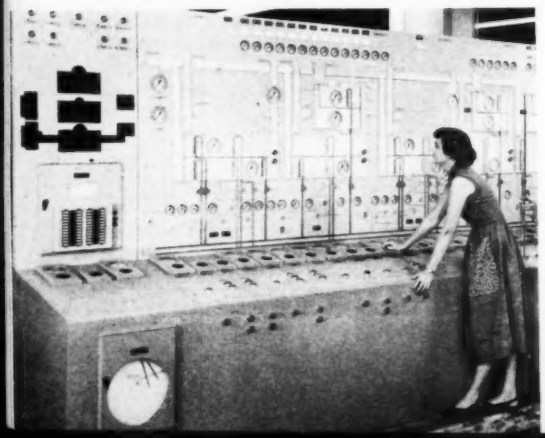
TELLERS at a Baltimore bank can compare signatures on checks and other documents without keeping customers waiting. An industrial TV system pipes images from a central record room to tellers' cages. Photo below shows RCA's miniature industrial camera (on stand) and monitor screen. Sloped cabinet on top of monitor is an intercom. Receiving setup is pictured at right.

Meter Counts Telephone Calls

THIS telephone meter will keep tabs on how many outgoing calls you make during the month. Just press the lever each time a call goes through and the tally shows at a glance. And the little sand glass warns you when a three-minute conversation is about up. Shelba Co., 37 West 23 St., NYC, makes it.

Panel Keeps White House Cool

THE heat of an election year won't affect the White House. An electronic control panel (below) regulates temperature and humidity. It monitors 106 thermostats that control the air-conditioning system—most elaborate ever installed in a residence. From it, conditions all over the President's mansion can be adjusted when necessary.



Sportsmen Stay Dry in Parka

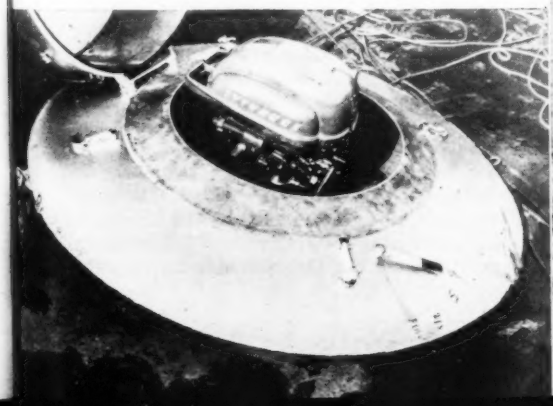
THIS plastic suit will keep a boatman dry through drenching rain or heavy spray. A two-piece outfit—parka with attached hood, and trousers with built-in suspenders—it offers more freedom of movement than a sou'wester and stiff oilskins. It's a good bet for fishermen, too. The Mardo Sales Corp., 480 Lexington Ave., NYC 17, sells it.

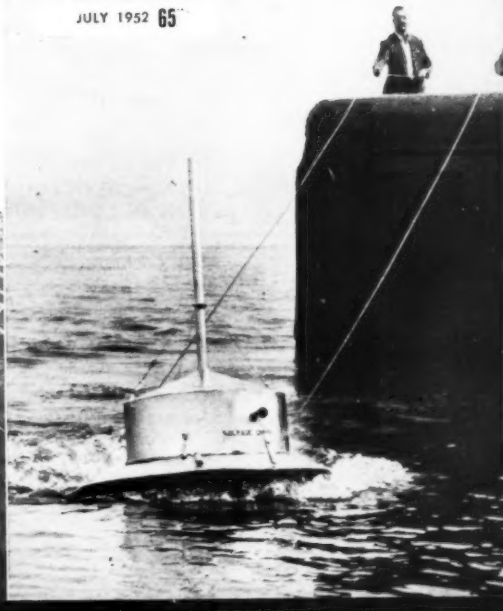
Tandem Rotors Lift Biggest Military Helicopter

ALTHOUGH it looks like an emaciated dirigible with a sag in the middle, the YH-21 Work-Horse can haul 14,000 pounds of cargo—more than any military helicopter now in use—or carry 12 litter patients plus medical attendant and crew of two. Designed for Air Force arctic rescue work, the 52½-foot craft will land on ice, snow, water, tundra, marsh or land. Encaged bags at the wheels can be inflated from the cockpit to form doughnut-shaped floats. Where landings are not feasible, a swinging-boom hydraulic hoist will lift litters from the ground. Made by Piasecki, it will also appear in two other versions—an assault helicopter and a 20-passenger troop carrier.

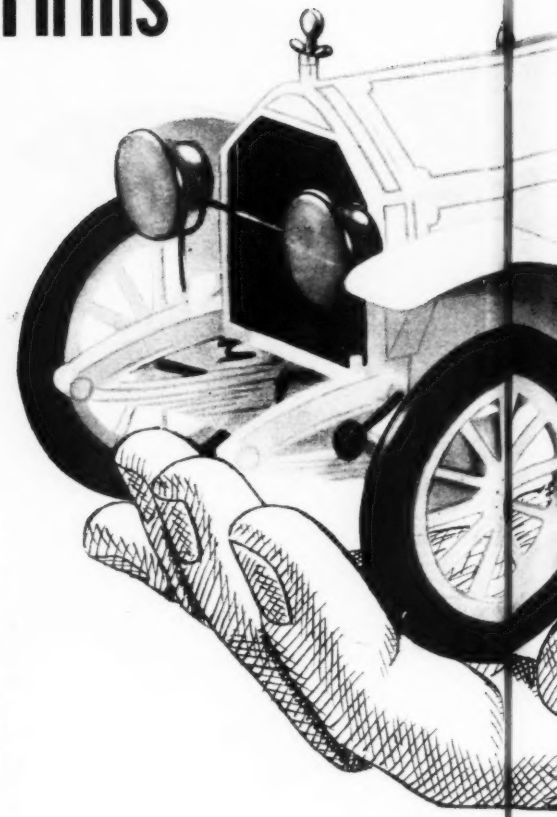
Floating Saucer to Carry Salvage Line to Stranded Ships

THIS seagoing saucer is designed to run a line from a salvage vessel to a stranded ship. An outboard motor, modified for shallow draft (below), propels it. A snorkel tube feeds in oxygen when the airtight lid is down (right). Two ropes steer the device. The inventor, Stanley Ehrlich of Portland, Ore., says he can make it turn around in its own track, return to the ship, or otherwise control it from hundreds of feet away.





Million-Dollar Firms Grow from Hobbies



Assemble-it-yourself kits have turned the model-building urge into a business bonanza.

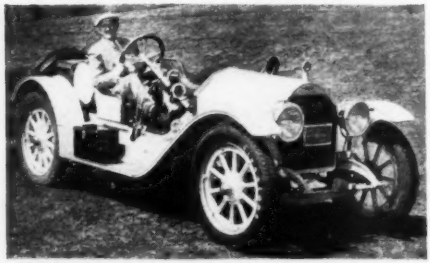
By Stephen R. Philips

PSM PHOTOS BY W. W. MORRIS

HOW would you like to do, in a big and highly profitable way, what you did just for fun as a kid? About 200 young men are in that enviable spot right now. And, what is more, they have created in the process a new industry.

These men are the manufacturers of model kits and supplies. In knee pants they whittled and glued because it was fun—in long pants they design and create miniatures for other hobbyists to assemble because it's still fun and jangles the cash registers as well.

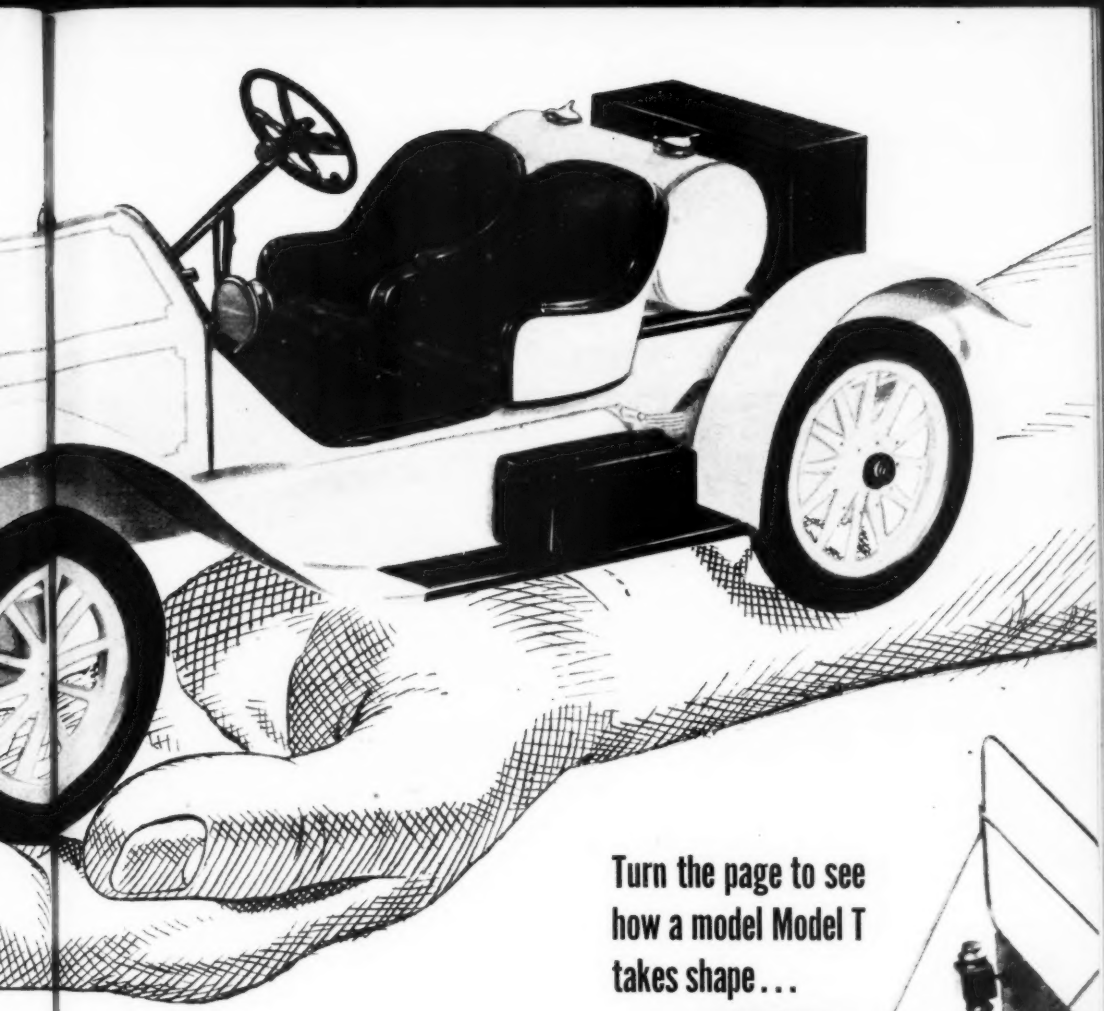
A model kit, sold in a gaily colored carton, consists of prefabricated bits and pieces which are put together at home by cutting, pasting, soldering, painting. Hundreds of separate objects, ranging from prairie schooners of pioneer days to the latest jet-powered fighters zooming over Korea are on the market, selling at anywhere from a dime to $50.



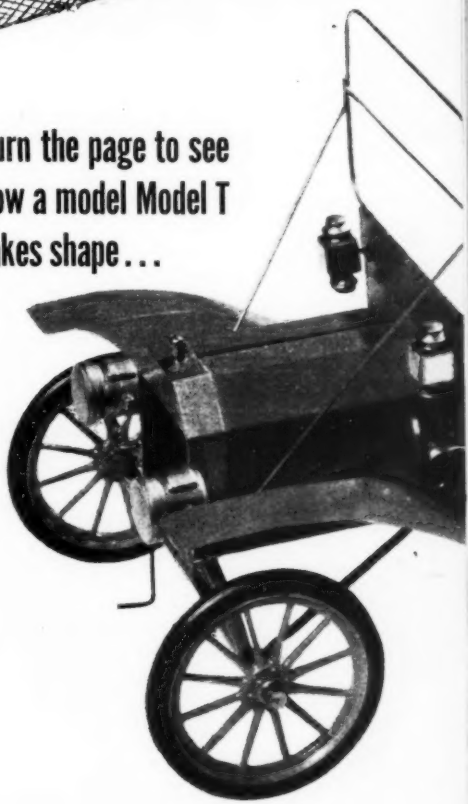
ASSEMBLY-KIT MANUFACTURER KOVELESKI at the wheel of his prize-winning Stutz Bearcat. It served as model for build-it-yourself miniature of same car, shown at top of page.

Grandson is a customer and so is gramps himself, and in between are stage and screen stars, public officials, corporation executives and just folks who like to make things when the day's work is done. Henry Fonda is a devotee and Gypsy Rose Lee is, too.

Another famous fan is actor Yul Brynner, who plays the role of the King of Siam in the Broadway production, *The King and I*. Brynner is an HO train addict. He puts trains together from model kits in his dressing room while waiting cues. With jeweler's precision, he has just assembled a locomo-



Turn the page to see how a model Model T takes shape . . .



tive containing 600 separate parts. Took him four weeks.

In less than 20 years, model-kit manufacturing has snowballed from a garret and cellar business to a $50,000,000-a-year industry, and the eye-popping fact is that many of the big manufacturers went into business on the thinnest of shoestrings.

Perhaps the most amazing success story is that of 42-year-old Anthony J. Koveleski of Scranton, Pa., whose Old Timers kits for assembling antique cars are illustrated on these pages. The son of a Pennsylvania coal miner, Tony quit school in the sixth grade and worked in the coal mines and silk mills to add a few dollars to his father's slim earnings. Later he went into the grocery business, but that was no fun. At the age of 24

he decided that it was high time he caught up on his boyhood.

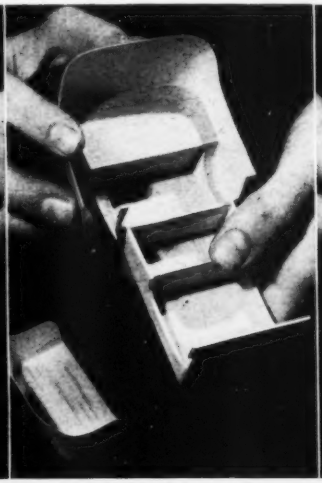
With a $30 investment he started a hobby shop in Scranton. That was fun, made people happy—and coined money. Then, four years ago, after serving as an instructor of flying instructors in the Army Air Forces, he organized Hudson Miniatures to put out his antique-car kits. So far he has rung up sales of $2,000,000 with business getting better and better.

Koveleski's interest in automobiles dates back to one day when he was eight years old. A big-shot gambler in his hometown of Kingston, Pa., took him for a spin in a flashy Stutz Bearcat.

"That was the most thrilling experience of my life," says Tony. "I sat on a curb after that ride and made up my mind that some day I was going to own a Bearcat."

Thirty years later he did, but by that time it was a 1914 antique—one of the rarest in the country—and holder of seven First Prizes in old-car competitions. Today, in

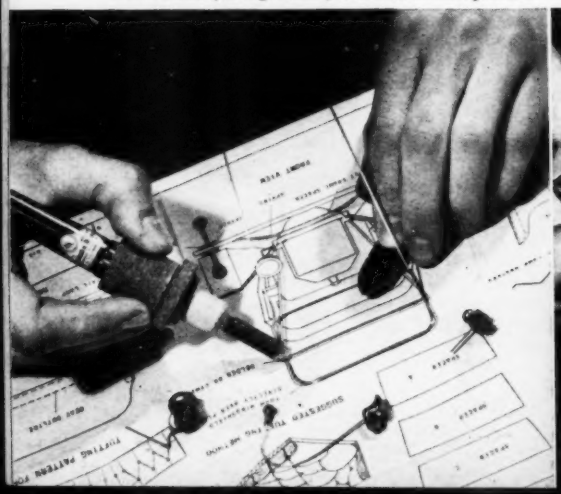
1 OLD TIMERS KIT for 1909 Model T has more than 80 prefabricated parts. Assembly begins with balsa-wood floor. Here hood cover, formed of cardboard, is being fitted.



2 REAR-SEAT BACK, of die-cut balsa, is formed around body and glued in place. Next, front seat, seen in foreground, is put in place. Detailed plans identify all parts.

3 UPHOLSTERY can be simulated by gluing in pre-cut balsa strips. For more elaborate job, muslin is stretched over layer of cotton and hand-tufted with needle and thread.

5 WIRE WINDSHIELD FRAME is bent to shape directly over diagram, and wire supports soldered in place. Wire lamp brackets and horn hose (foreground) have been completed.



6 SPRINGS are made of fiberboard strips. The leaves are cut to size and assembled and glued together. At bottom is shown rear axle with differential and brake drums in place.

three garages scattered around Scranton, he has more than a dozen antique cars. A machinist, he has rebuilt them himself, to the last authentic accessory. They serve as full-size models for his miniature assembly-kit cars, which reproduce in exact scale every measurement and detail.

Another young man, William L. Effinger Jr., president of Berkeley Models, Inc., of West Hempstead, L. I., expects to sell $1,500,000 worth of kits and supplies this year. He started in 1933 with a total cash investment of—hold your breath—$2.75.

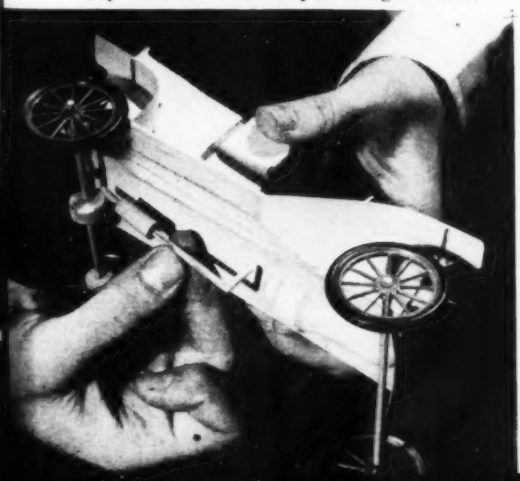
There was an old carriage house in the rear of Bill's Brooklyn, N. Y., home, where the neighborhood kids would meet to build model planes. They needed supplies and Bill, while still in high school, decided he was the boy to provide them. He invested his $2.75 in balsa wood and, using a home-workshop saw, cut it into usable pieces. Then he bought wire, paper, glue. The kids were delighted and Bill's pockets soon jingled with cash.

Several years and about $1,000 later, Bill put out his first construction kit. It sold so well that his father joined him, handling business details while Bill was studying for an engineering degree.

In 1938, Bill's plant outgrew the carriage house and he took over a two-story structure. Then followed a succession of moves to larger quarters as sales soared, until now he runs one of the largest model-kit plants in the U. S.

4 CAR TAKES SHAPE. Body with seats installed has been joined to frame and engine-hood assembly. In this photo fenders are being fastened to running board. Bent-wire fender supports can be seen in foreground, already attached to radiator base.

7 WITH WHEELS in place, muffler unit is mounted. A few more parts and fittings, and car is ready for painting. Average assembly time for finished job is eight hours.



Model-Kit Bug Bites Early

This fascinating industry, which has given so many hobbyists a chance to cash in, was actually born following the first world war. But it was an anemic infant and didn't begin to perk up until Charles A. Lindbergh hopped off one dawn in 1927 and made the first solo transatlantic flight. He planted aviation in everyone's mind. Then came the stock-market debacle of 1929 which, paradoxically, provided another shot of vitamins for the young industry. Doctors urged overwrought businessmen to turn to "doing things with your hands" as a relief from tension.

World War II brought interest in matters

Here's the finished model Model T . . .

aeronautical to fever pitch. Returning GIs, for whom new horizons had opened, put their new skills to work on amazing miniatures of boats, cars, railroads and flying equipment. The industry grew to manhood, husky, muscular manhood, and it's now reaching for more worlds to conquer.

The inventiveness of the model-kit makers is limited only by their imaginations. A virtual history of America is represented by the bewildering variety of miniatures which flows steadily from the designing boards and workbenches.

Fire Trucks to Sailing Ships

They range from pre-World War I aircraft to jets, antique autos to hot rods, tall-masted sailing ships to streamlined speed boats, covered wagons to tanks, Revolutionary War fire wagons to the newest shining apparatus, and practically everything to enchant a model railroader from the earliest days of steam to tomorrow.

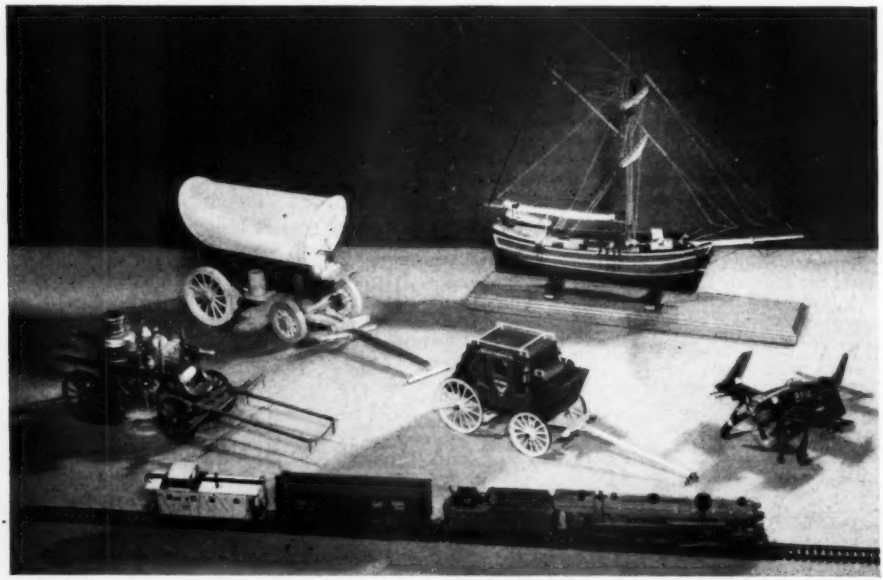
How about visiting one of these model-kit factories to see how things work from the inside? Bill Effinger's plant in Long Island is a dandy example. Let's take just one of the many kits which Bill's Berkeley Models puts out and trace it through from the germ of the idea to the time it lands on the dealer's shelf. His SNJ is a typical kit. Here's how it came about:

In planning a new line, Bill draws up a list of some 50 or 60 possible items, all well known planes and boats. From this list, he ultimately selects 10 or 15 which contain those features he believes will capture the imaginations of his customers. The SNJ (that's the Navy designation; the AAF called it the AT-6) was picked because it had taught more combat fliers than any other plane and Bill believed that the hundreds of thousands of pilots who had flown it would remember it fondly. Moreover, it had not yet been offered by anyone else on the market.

Design Follows Original

Having chosen the plane, Bill's next step was to get every possible scrap of available data so that the final model would be as exact a replica in miniature as possible. From North American Aviation he obtained three-view drawings, pictures taken at all angles and other specifications. From the

[*Continued on page 210*]



ASSEMBLY KITS are made to suit anyone's hobby, skill and pocketbook. Above are shown only a few of scores carried by Polk's Hobbies, New York. They range from the Ideal Model Wells Fargo stagecoach that sells for $1.50 and can be put together in a few hours, to the Bowser locomotive and tender kit that costs $37.50, takes months to assemble.

Plane Dispatcher Pilots Scooter

THE rider of the tiny, fractional-horsepower Corgi above is a busy man at London Airport. He scoots from plane to plane, examining the condition of the runways as he rides. He gets the pilot's okay on every British European Airways plane before take-off, checks catering arrangements and radios in his reports via walkie-talkie.

Mobile Drill Digs Wells Fast

EARL SUTTON of Evansville, Ind., had a nice homesite, but no water. Two hours and 10 minutes after the drill rig above rolled onto the property, he drank from his own 60-foot well. The rig, designed for rotary, auger and percussion drilling, is mounted on a truck having power take-off. Mobile Drilling, Inc., Indianapolis, makes it.

This Boat Mast Is Made of Glass, but It Won't Break

A 160-POUND man can swing from the middle of this 19-foot boat mast and it may bend a bit—but it won't crack or break. It is made by wrapping glass-fiber cloth around and around a form revolving on a mandrel. When slipped from the form, the spiral wrappings—nine layers thick at the base decreasing to five turns at the tapered tip—produce the hollow mast. Weight? Only nine pounds.

What It's Like to Fly a Car

You can land this airphibious vehicle at an airport and then simply unhitch the wings and drive the body off into town.

By Wilbur Shaw and Devon Francis

PSM PHOTOS BY HUBERT LUCKETT

A FEW years ago a calm, personable gentleman named Robert Edison Fulton Jr. got mad at an airplane. He could fly the thing from airport to airport, but he couldn't drive it on a highway. After he landed he had to scrounge around for a car or a taxi. It was exasperating. So Fulton decided to do something about it. He built an automobile with wings.

Now, after a quarter of a million miles of airphibious testing, he's getting ready to start production for sale this fall.

We've just flown the vehicle that Fulton calls his Airphibian. We've driven it, too.

You can park it in your garage. If you want to make a trip with it aground, step

Just leave the wings at the airport and drive the Airphibian home. Wilbur Shaw shows how.

As much at home in the air as on the highway, flying automobile cruises nicely at 110 m.p.h.

on the starter, back out and take to the highway. It will sail along at speeds up to 60 miles an hour. If you want to fly it somewhere, drive it to an airport, attach the wings and take off.

Fulton thinks nothing of flying his machine several hundred miles between breakfast and lunch, taking off the wings and driving it a hundred miles or more, and then reattaching the wings for a flight of another several hundred miles before dinner time.

One person can put on the wings or take them off in less than five minutes. That, of course, is the secret of the thing's utility—the ease of the quick change.

Robert E. Fulton Jr.

We drove—beg pardon, flew—the automobile off Westchester County Airport, a few miles north of New York City. We had to take turns with Frazer Dougherty, test pilot for Fulton's company, Continental, Inc., of Danbury, Conn., because the Airphibian is only a two-seater.

"Climb in," invited Dougherty.

One long safety belt snugs in both pilot and passenger. There is only one control wheel and one set of rudder pedals—no dual controls.

The driving compartment—or cockpit, as you wish—looks like that of an airplane. There is the usual array of airplane dials and controls, only now the same ones are used for driving as well as flying the Airphibian.

"You want to know," remarked Dougherty, who must be psychic, "whether the wings are locked on securely?"

"It would help," we said.

"Okay." He flipped a switch. A check light glowed on the instrument panel. "If everything isn't all right, the light won't work. It's a safety device, just in case you forget something."

"And," we remarked, "if you don't happen to notice that the bulb's out, you take off and shed your wings in mid-air."

He grinned. "No, even if you tried to take

TO UNMATE road and flight units, you first release two clamps in back of seat. Dubbed "sky hooks," clamps are two of seven locking pins that secure car to wings and fuselage.

THREE PINS extending from car body into sockets in fuselage are unscrewed next by cranks. As fuselage is released, foot brake, road transmission, engine fan automatically engage.

off, you still couldn't unless everything were battened down. You see, the engine starter wouldn't work, either."

We fired up. To taxi, you just rotate the control wheel as in a car. That turns the front wheels. In most small airplanes you have to turn by pushing on one of the rudder pedals to swivel the tail wheel.

"Just hold her straight," intoned Dougherty over the clamor of the engine as we gained speed on the runway. "Like guiding a car. Ease back on the wheel at about 65 miles an hour."

15 Minutes by Car—Two by Plane

We pulled back. The Airphibian came unstuck. We climbed. It was just like an airplane except that it was a car with wings.

The rate of climb was somewhat slow—about 585 feet a minute. That already has been remedied in a newer model, with more horsepower, that will climb 720 feet a minute.

The cabin was noisy because as yet it contained no soundproofing. We leveled off at 1,000 feet and set the throttle by the tachometer at cruising revolutions, around 2,400 r.p.m.

The Airphibian was stable in the air. It felt good. Flying slightly cross-wind, the airspeed dial indicating 110 miles an hour, we made it from the airport to nearby White Plains in two minutes. The same trip takes 15 to 20 minutes by car. Miles to the south, Long Island Sound sparkled in the sunlight. Miles to the west, the Hudson River flowed toward New York Harbor.

The air speed was just over 50 miles an hour as we flared out for a landing at the airport. The Airphibian settled a bit faster than we were accustomed to in this size of aircraft. But the landing was a sheer joy. We kept the nose a trifle high. The rear wheels touched and the front ones came down of their own accord. There was no shock, no tendency to bounce.

"Now!" said Dougherty as we parked and cut the switch. "Here's all you do."

In four minutes and 48 seconds, the wings, fuselage and propeller were off, and the Airphibian was an automobile. Dougherty locked the throttle in the closed position.

"The right rudder pedal is the brake," he explained. "The pedal to the right of that is the accelerator. The gearshift is that little lever on the floor just in front of the seat. It's sort of like a Hydra-Matic—there's no clutch—just push it forward to drive and back for reverse."

We decided that the complicated panel would prove confusing at first to the workaday motorist. As an automobile, the Airphibian is complete with turn signals, sun visors, rear-vision mirror, heater and license plates. The aeronautical radio works on standard broadcasts, too.

Flying on the Ground

"Now you release the hand brake," said Dougherty. That, instead of the foot brake, is used to shorten the landing run.

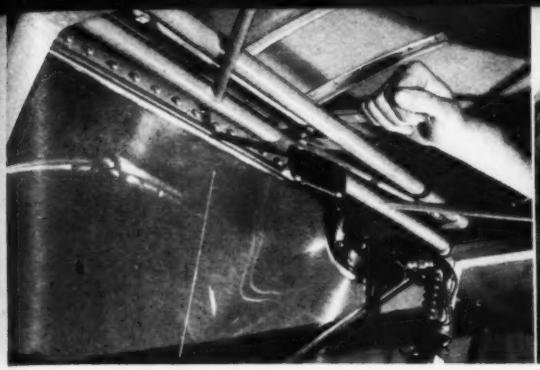
We stepped on the accelerator.

"Easy!" cautioned Dougherty. "You've got power to burn."

He was right. You could almost spin the rear wheels from a standing start. Before we knew it, the speedometer was reading 50 in a 30-mile zone. A traffic cop stared. We slowed down.

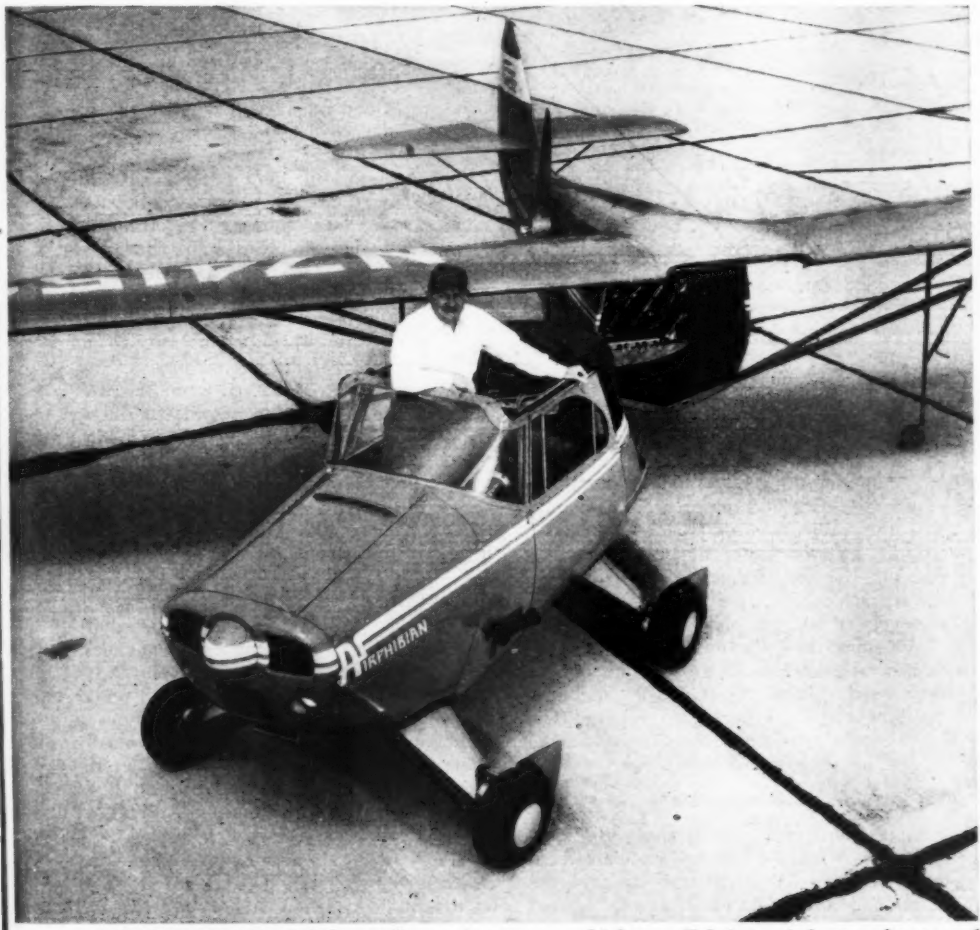
The tachometer indicated an astonishingly low r.p.m.—about 1,700—at 50 m.p.h.

For highway travel the Airphibian's ride

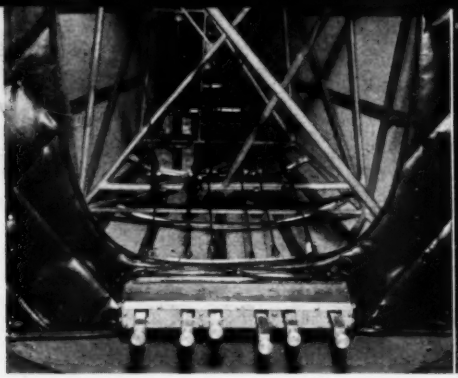


THIS LEVER unclamps front of car body from leading edge of wing. Outrigger wheels—which will disappear into wing in later models—also must be lowered along with tail wheel.

PROPELLER IS REMOVED in last step, as Shaw is doing here, with built-in wrench that unscrews it from front drive shaft of engine. He will transfer prop to stud on side of fuselage.

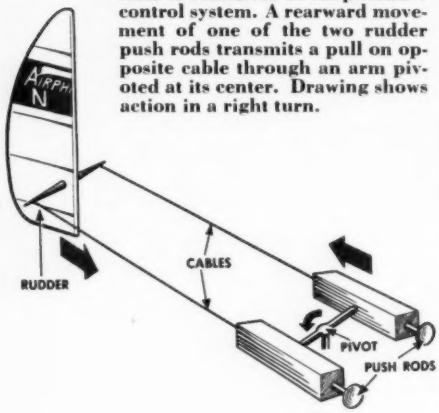


DETACHED FUSELAGE is left standing on its outriggers and tail wheel, and car is ready to roll on highway. Fabric top is buttoned to top of the windshield for driving in wet weather.



CONTROL LINKAGE between car body and fuselage is simple. When units are assembled, these six push rods in fuselage contact similar rods in car body, as shown at right above.

TWO RODS operate ailerons, two the rudder, two the elevator. But control cables can't be pushed; they must be pulled. How a push becomes a pull is shown in diagram at left below.



HERE IS PRINCIPLE of Airphibian's control system. A rearward movement of one of the two rudder push rods transmits a pull on opposite cable through an arm pivoted at its center. Drawing shows action in a right turn.

was a bit hard, slightly bumpier than that of a sports car. The reason was, of course, that the vehicle's springing was designed for the combined weight of all its components—the car, wings, fuselage and tail surfaces. When it is only a car, the suspension gets stiffer.

We found that the engine cowling—pardon, hood—was a shade too high for perfect downward visibility. But the handling qualities on the ground are superb. The lateral stability is amazing. You can take corners at a surprising speed.

Tread Is Wide

That's partly because of the wide spacing of the wheels—67 inches center to center. The tread has to be wide to give the Airphibian ample stability on the ground in landing and take-off runs when it's an airplane. Part of the stability also comes from individually springing all four wheels.

You sit higher in the Airphibian than you do in a conventional car. That's because the supports between the wheels and body must be long enough to give proper shock-absorber travel for cushioning landings when the Airphibian is an airplane.

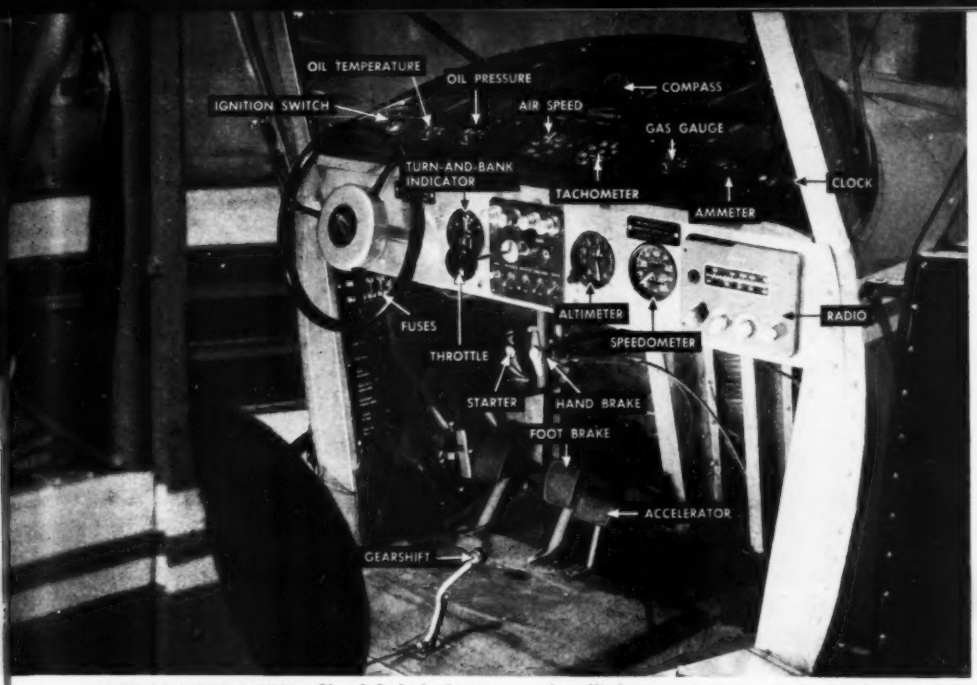
That's about the only difference to the feel of driving, though. Your eyes, of course, must become accustomed to spotting the air-speed dial—beg pardon again, the speedometer—on the panel. And you must be alive to one real hazard on the ground. Every time you pull up at a stoplight other motorists gawk so hard that they're likely to get off course when traffic begins moving. Fulton's records show that in some 250,000 miles of traveling in the Airphibian during the proving trials, he and his test pilots have driven it on the highway seven times for every time they have flown it. But—and here's the pay-off—they have flown it 300 miles for every 100 miles they've driven it. It goes a lot faster in the air.

Hurry Up and Wait

Fulton got to thinking about his Airphibian during World War II when he was making gunnery trainers for airmen. He had a force of 40 field men to service the trainers all over the country and instruct budding airmen in their use. His field men, mostly pilots themselves, would sashay into an airport by plane and then spend a couple of hours trying to find ground transportation.

That's when he began getting mad.

"I kept saying to myself," he recalls, "that an airplane, after all, had what it took to be a land vehicle—an engine, wheels and controls. Why couldn't it be driven down the road?"



LOTS OF INSTRUMENTS. Not labeled above on throttle panel are engine controls, horn, and headlight, navigation and check switches. Wheel hides directional gyro and turn signals.

He had a host of problems to whip. He had to find a means of transmitting engine power alternately to a propeller and the rear wheels of his vehicle. How he gets it to the wheels is the only item on the Airphibian he won't discuss yet. We can disclose, though, that in his initial production models, to sell for between $10,000 and $15,000, the drive will differ completely from the one we saw. That's not because the present one isn't all right. For government engine certification, Fulton—no relation to the man who built the steamboat—drove the Airphibian as a car for 1,000 miles at an average of 40 miles an hour, so it works as it is.

[Continued on page 240]

FACTS ON FULTON AIRPHIBIAN

Model: FA-3 two-seater.

Engine: Franklin air-cooled 6-cyl. valve-in-head, horizontally opposed; 150 hp. at 2,600 r.p.m.; compression ratio, 7 to 1; piston displacement, 335 cu. in.; bore and stroke: 4½" by 3½"; crankshaft bearing surface, 38 sq. in.; torque, 302 lb.-ft. at 2,600 r.p.m.

Brakes: disks with "spot" contacts.

Suspension: independent rubber torsion mounts on four wheels.

Inside dimensions: seat-cushion width, 34"; leg room, 47"; headroom with top up, 36"; seat height, 11"; vertical distance, steering wheel to seat cushion, 7½"; seat adjustment, horizontal none, vertical about 3".

Tire size: 6.00 by 6.

As a Car

Piston travel: (in feet per car mile at 20 m.p.h.) 658.

Weight: 1,120 lb.; per hp., 7.5 lb.

Transmission: unannounced.

Steering ratio: 4 turns lock to lock; radius of turning circle, 18 ft.

Outside dimensions: height, 66"; over-all length, 132"; width, 72"; wheelbase, 72"; overhang, front 24", rear 33"; tread, front and rear, 67".

Speed: 50-60 m.p.h.; fuel consumption, 20 m.p.g.

As an Airplane

Weight: (empty) 1,520 lb.; per hp. (power loading), 10.1 lb.

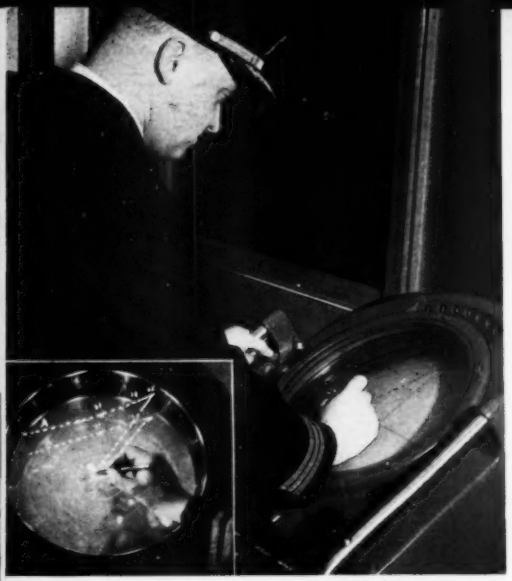
Transmission: ungeared 3-bladed, fixed-pitch Sensenich propeller.

Outside dimensions: height (to top of vertical stabilizer), 92"; over-all length, 201"; wing span, 408".

Wing area: 152 sq. ft.; wing loading, 13.8 lb. per sq. ft.

Rate of climb: 585 ft. per min.

Speed: 110 m.p.h. cruising; fuel consumption, 8 gal. per hr.



Radar Plotter Aids Pilot

EVEN ships with radar have collisions—too many of them. But a new device is expected to eliminate much of this danger. Until now the navigator has had to transfer radar readings to a chart in another room, a time-consuming process offering many chances for mistakes. With Raytheon's radar plotter, he can mark the path of a nearby ship on a plastic sheet directly over the scope. A tricky optical system eliminates any error caused by the fact that plastic sheet and scope face are several inches apart.

Deaf Dog Hears Again

WHEN 14-year-old Laddie lost his hearing, his owner built him a battery-powered hearing aid. Worn around the neck like a St. Bernard's keg, the device functions like a public-address system. Sound is picked up by a microphone, then amplified and transmitted through an earpiece. The cocker spaniel's master, Phil Savage of Huntington Park, Calif., turns the aid off each night, on again in the morning. Unlike a human who can switch off his own hearing aid, Laddie must listen to scoldings.

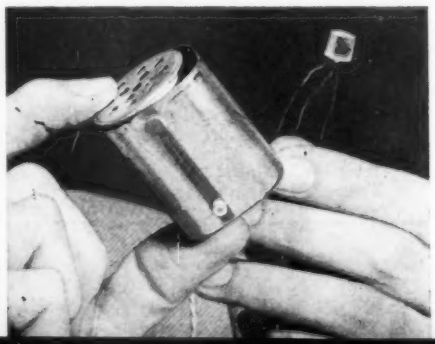
New Cycle Has Self-Starter

POLICE on the parking-meter beat will have an easier job with this new motorcycle. It has a push-button self-starter, three forward speeds, and a reverse to simplify maneuvering in tight spots. Chain drive has been replaced with a shaft.

Indian claims that a policeman can learn to ride the three-wheeled Patrol more quickly than a two-wheeler, and that it is safer. The box between the two rear wheels is an emergency seat for two men, and carries guns, lights, first-aid kit and other equipment.

Radio Station Fits in Pocket

THE new radio transmitter below may not fit in a wrist watch, but it's not much bigger than a pocket lighter. Secret of the small size is a tiny germanium-crystal transistor, shown at right. Replacing an amplifier tube, the transistor uses minute amounts of power, enabling the set to run on a miniature dry cell inside the case. The transmitter, which has a range of several hundred feet, is an experimental unit made by Everett Read of the General Electric Electronics Laboratory, Syracuse, N.Y.



GI Jeep Dons Dress Uniform

MEMO to GIs the world over: They're slicking up the jeep for you.

When you get your hands on the newest version of the famous old four-by-four—known as the jeep in any language, including Hindustani—it won't jounce you around quite so much; it will go a little faster—about 70 instead of 65; it will have some curves where all those angles were.

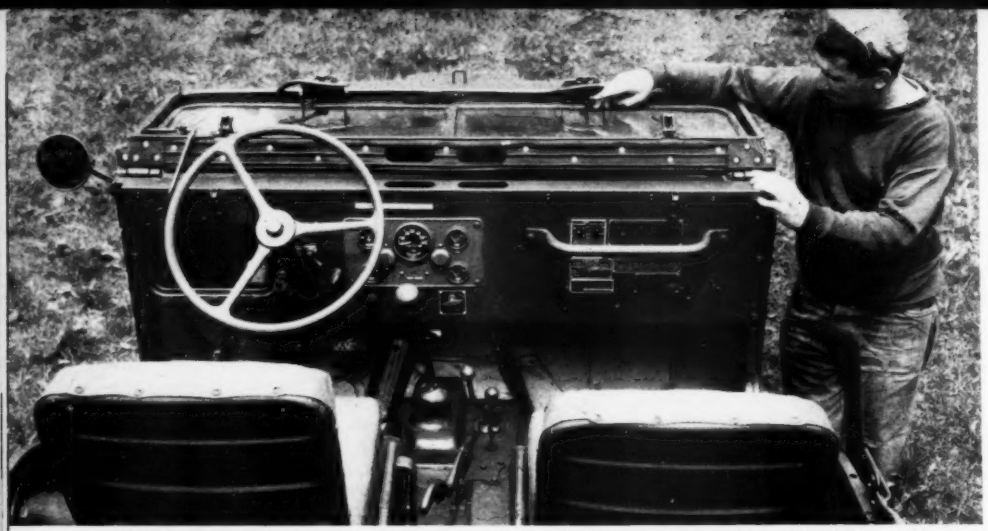
You'll have a little more room for your feet, and when you raise the hood you won't risk having the darned thing fall on your head. The car will be easier to start when the mercury slides to zero.

Remember how you cussed out all the strapped-on stuff that caught branches on narrow roads? Well, the sides are smooth now. No more projections. And bet you can't guess what they did with the shovel that used to hang on the side—it's on a bracket inside the hood.

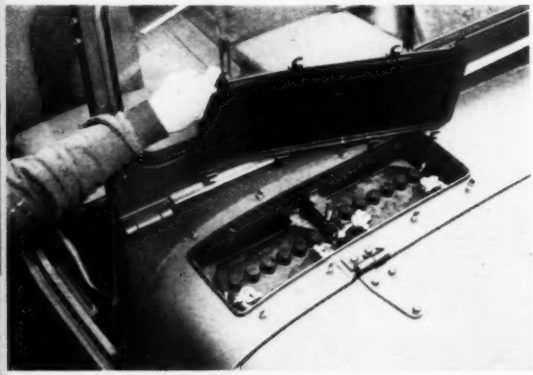
You've had your troubles working on the

STREAMLINING has come to the jeep—and its driver. Note new curves (the hood and fenders, we mean) and recessed headlamps. The body (jeep) is longer, wider.

Fancied-up, it's still the same combat vehicle that has toted presidents and fighting men from Guadalcanal to the Elbe.



ARCTIC-STATIONED GIs will appreciate windshield defrosting supplied by hot-air inlet holes seen above dash. Handle at right is to prevent losing passenger on curves.



BOTH BATTERIES of 24-volt electrical system, boosted from the six volts of World War II jeep, are sunk in a cowl compartment. Formerly one battery rode under the hood.

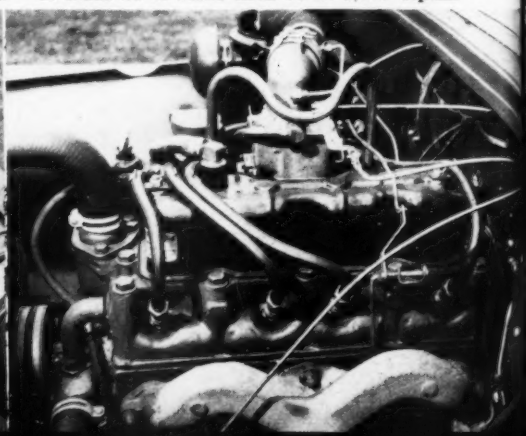
innards of the jeep, in that little engine compartment. You can relax, soldier. The designers have come along and given you a lot more elbow room under the hood. Measures 24 inches deep by 33 inches wide. Now you can really get at the thing with a wrench.

How many times has the guy riding in the right-hand seat searched for smoking words to describe a motor vehicle, government-issue, without automatic wipers on both sides of the windshield? The new jeep's got 'em.

And remember those shocks? Get on a washboard road with the old jeep and, after the first bump, it was just like not having any shock absorbers at all. They "faded," as the engineers say. Well, that's been mended, too. New shocks. They'll go on for hour

WATER doesn't bother the engine. Mechanic's hand points to the new waterproofed ignition harness. The clutch and transmission also have an improved waterproofing treatment.

ENGINE IS AN F-HEAD, meaning that intake valves are in the head, and exhaust valves at the side as in an L-head. This raises horsepower from 60 to more than 70 at 4,000 r.p.m.



STEEP HILLS never fazed a jeep, but the new one takes them more easily. Other improvements include: bigger brakes, softer pedal action, steering ratio upped from 15.3 to 19 to 1.

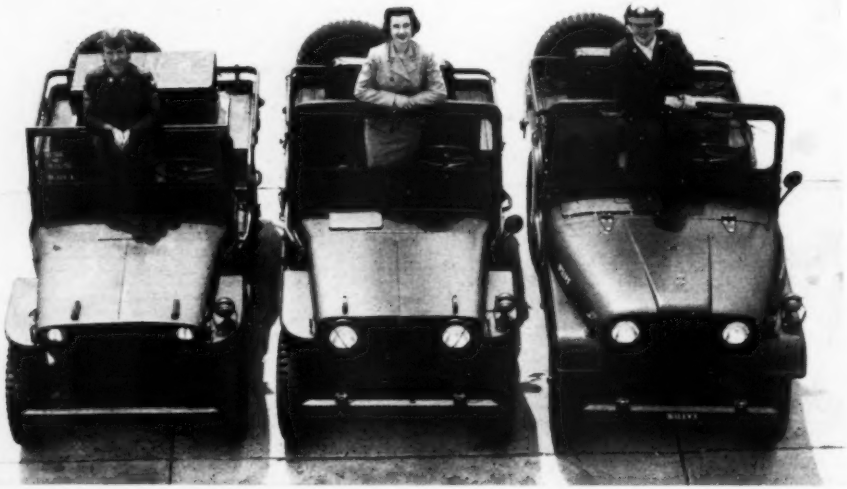
SNORKEL permits engine to breathe while fording a stream. Pressure built up in crankcase to keep water out is now bled to bell housing and transmission to do same job there.

after hour smoothing out the bumps. And the seats have softer springs and are covered with plastic instead of fabric.

Remember the time you accidentally hit the light switch under blackout conditions and the brights came on? Well, the sergeant can't eat you out for that one anymore. They've put the light controls behind the steering column, out of the way. And you don't have to be a contortionist to reach both primer and choke at the same time for cold-weather starting. They have been placed one on either side of the steering column. The cable type of emergency brake on the dash has been replaced by a ratchet type between the front seats. All steering tie rods have been beefed up and the four universal joints on the two drive shafts are, for the first time, sealed and lubricated for the life of the vehicle.

Guess that about buttons it up—except that the compression ratio is upped from 6.5 to 6.9 to 1. Willys-Overland Motors, in Toledo, which turned out many of the hundreds of thousands of World War II jeeps, says this new one is really the fourth generation of the four-wheel-drive quarter-ton truck (that's what the Army calls it). The one you probably know best was the second generation. The third-generation jeep came out in 1950. It included some modifications and was called the M38. Now Willys is starting production on this new one, to be known as the M38A1.

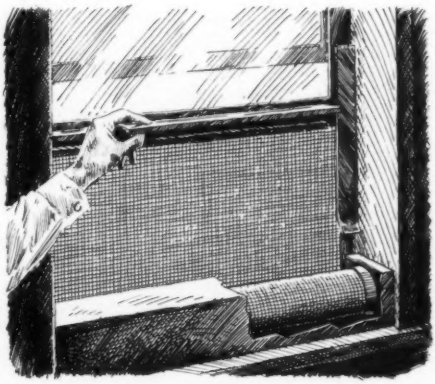
Whatever designation it bears, it will still be a half-pint truck in olive drab. You didn't join the Army to ride around in Rolls-Royces, soldier.—*Devon Francis.*



JEEP'S EVOLUTION is shown above starting with famed World War II model (left) that was recently exhibited by New York's Museum of Modern Art as one of eight automobiles selected for their excellence as works of art (PSM, Nov. '51, p. 161). Postwar development of M38 (center) led to bigger, streamlined job (right). Is the new jeep as pretty? No, lamented the Museum's Director of Architecture and Design: "A typical case of styling—and ugly styling at that—ruining a good, clear example of machine art. It is the usual case of bloating used to make cars look bigger by adding unnecessary curves."

New Ideas from the Inventors

1 Wheel to Power Refrigerator. Perishable produce could be kept safe by the truck engine's power with a trailer like this. An extra road wheel would drive a compressor through an electric clutch. Actuated by a temperature control, the clutch would engage or disengage the compressor. An auxiliary electric motor that could be plugged in anywhere would take over when the truck stopped.



2 Screen to Open With Window. This roller screen would let in more light on gray days when the window was closed or partly open. One end of the screen would be attached to a spring roller, the other to the sash bottom. As the window opened, the screen would rise in fitted guides and be held up by the window counterweight.

3 Bottle Cap to Time Medicine Doses. You would be less likely to forget to take your pills on schedule if the bottle had a reminder cap. Each time you took a dose you would set this pointer to the time when the next one was due. Closing the bottle would lock the pointer at its setting.

Please turn the page for more new ideas.

MORE New Ideas from the Inventors

4 Deflector to Stop Car Drafts. This plastic air conditioner would shield the head and face of a back-seat passenger from air blasts. Clipped into a side window, it would move air downward, providing indirect circulation throughout the car.

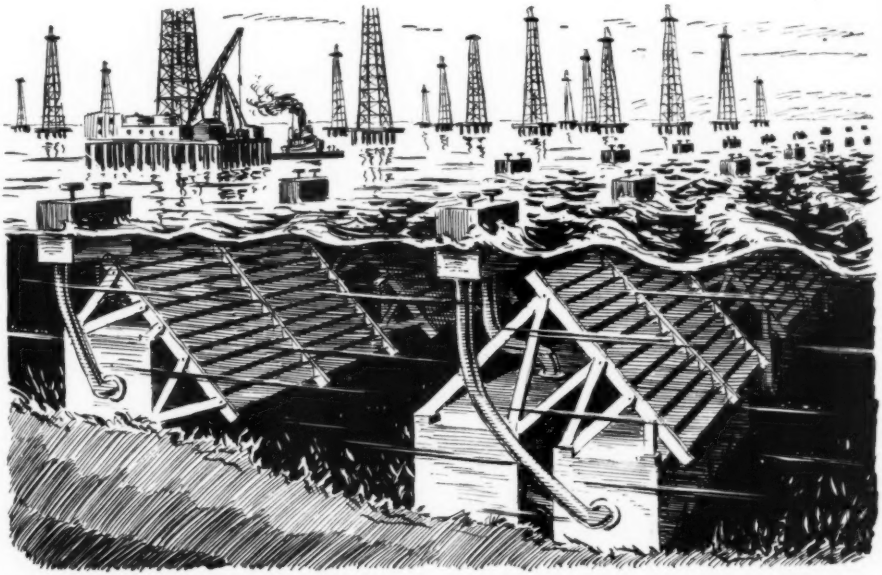
5 Sharpener to Point Crayons. Soft crayons get blunt quickly but your youngster could make them good as new with this sharpener. Flat blades would shave the wax to a uniform taper while a separate cutter peeled the paper jacket.

8 Inner Door to Save Cold Air. Letting warm air into the refrigerator every time you open the door increases your food-storage bill. On this refrigerator a sliding inner door would seal off part of the box. Items stored on covered shelves would be kept colder at lower cost.

9 Mold to Shape Hamburgers. You could always be sure your hamburgers would fit the buns if you made them with the help of this mold. The inventor also points out that pressing meat down onto a hot grill sears it quickly and enables it to retain more of its juices.

6 Square to Mark and Measure Wood. A channel in one leg of this try square would form a track for a pencil holder. The spring-retracted pencil could be moved along the scale, then pressed down to make an accurately measured mark.

7 Saddle to Hold Radio. A lone ranger might not feel so lonely if he had a radio with him. A reinforced pommel on a western-type saddle would hold this receiver. The antenna would be taped to a stirrup strap and batteries would go in a pouch.



10 Breakwaters to Guard Ocean Wells. These floatable wave breakers could be towed out to protect offshore oil-drilling rigs. Since finished wells need less protection, some of the breakwaters could later be re-used on the other jobs. Water would be pumped into the pontoons to anchor them, pumped out to refloat them.

Patents on these inventions have been granted to: 1. D. Tiffany, Great Falls, Mont.; 2. H. Renton, Germantown, Pa.; 3. H. Guion and E. Arnold, Los Angeles; 4. H. Riggs, Louisville, Ky.; 5. F. Swinehart, Strongsville, Ohio; 6. B. Boston, Pine Wood, S. C.; 7. E. Rovere, San Francisco; 8. G. Kuchler, Brooklyn; 9. A. Belt, Bloomington, Ill.; 10. P. Guarin, Houston.

Navy Doctors Ride World's Fastest Merry-Go-Round

Arm of human centrifuge has gondola at one end, 35 tons of steel counterweight at the other.

The brass ring they're reaching for is the information that will let men and machines safely fly faster than ever before.

By Herbert O. Johansen

IN AN open field amid the peaceful, rolling country of Bucks County, Pa., a small carnival had pitched its stand. The shrieks of delighted youngsters competed with the wheezes and groans of an ancient merry-go-round. It wasn't very fast, but the riders on the outer rim experienced a pleasant emptiness in the pits of their stomachs.

Not far away stood a white, circular building of modern design. Within its walls whirled a very different kind of merry-go-round, one of the most fantastic tools of scientific research—a human centrifuge that can spin a man-carrying gondola up to a speed of 174 miles an hour in less than seven seconds, exerting G forces that could tear the occupant's insides apart.

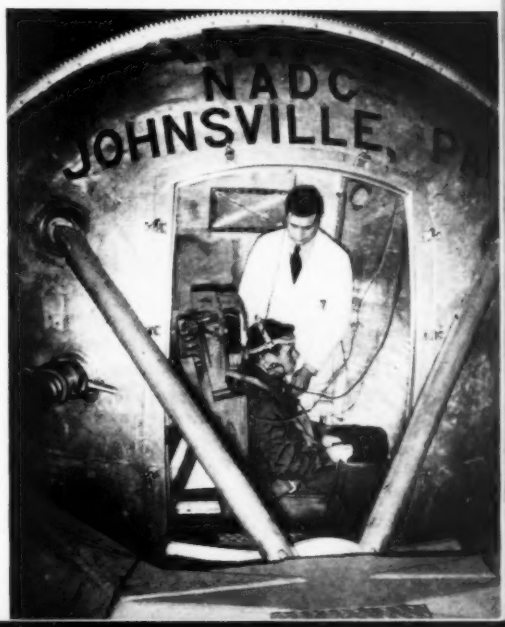
The white building is the new $5,000,000 Aviation Medical Acceleration Laboratory of the Naval Air Development Center at Johnsville (PSM, Feb. '48, p. 98), which was opened last month. Its core is the monster merry-go-round, a 50-foot tubular-steel arm. When whirled by a 4,000-horsepower, 180-ton electric motor, its gimbal-gripped aluminum gondola reaches a top speed of 48½ revolutions a minute, subjecting an occupant to an acceleration rate of 40 G. (One G is the normal acceleration of gravity; at 40 G, there would be 40 times the normal pull on the blood, internal organs and all other parts of the body of a gondola occupant.)

A G-RIDER, wired so his physiological reactions can be measured, enters the centrifuge gondola from wall-port loading platform. At far left is Commander C. F. Gell, Acting Director of the laboratory. Below, Lt. James E. Ziegler makes final adjustments before a spin.

Altitudes up to 60,000 feet can be simulated by pumping air out of the gondola.

The Navy doesn't plan to spin human beings at such high G forces at present, but the delicate instruments of guided missiles and rocket weapons have to take such strains today. This is their test bed. But the time may not be far off when men will have to stand such terrific, torturing acceleration during violent climbs, dives or turns in super supersonic airplanes and manned missiles—or before space flight with passengers becomes a reality.

The new centrifuge was designed to give scientists a short cut to the answers of how to live with high G forces. To yield a true picture of what happens during shock-packed acceleration in actual flight, the centrifuge must be able to wind up to its



dizzy whirl fast. Today's faster-than-sound planes develop G forces in a hurry.

It took almost five years to build the centrifuge because nothing just like it had ever been built before. The 10- by 16-foot aluminum gondola is shaped like a flattened sphere—technically, an oblate spheroid. It had to be hammered to shape practically by hand as there was no machine that could do the job. Another problem was the design of the gimbal system that enables auxiliary hydraulic-electric motors to control the gondola in all positions during a spin.

Gondola Carries 600-Pound Load

A payload of 600 pounds (that means 24,000 pounds at 40G) can be carried in the gondola. This load may consist of a man or a monkey (the monkey may have plastic windows in its skull so that observers can watch the flow of blood and brain fluids), plus television and movie cameras, high-speed moving-picture X-ray equipment, and various delicate sensing and measuring devices that record body reactions.

These reactions are recorded electrically on moving strips of paper in a room above the centrifuge chamber, where television screens also are located to show a live, running picture of the subject's facial and muscular reactions during a speed spin.

The whole operation—from the siren that blows to announce the start of a run to the air-braking, which, with the aid of two electric eyes, brings the gondola to a stop lined up with the wall-port loading platform—is controlled from a glass-enclosed blister hanging down into the centrifuge room.

Cams Control Spin Pattern

The complex pattern of the 40-second run, with speeds varying and gondola positions changing, can be controlled by three cams—one for radial speed and two for gimbal positioning. These cams, which can be cut to set up any desired conditions, are "played" on a special turntable like a phonograph record.

The gimbal motors' control circuits and the wires that carry running reports of reactions during a spin are linked to the observation and control stations through slip rings on the vertical rotor shaft. There are 52 of these rings, 22 for power and 30 for picking off physiological data. While brass is good enough for the power rings, the physiological-circuit rings require a combination of metals to eliminate all possible electrical interference. Some of the more critical rings are brass plated with silver, then coated with palladium and a final plating of rhodium.

Static and magnetic interference was another problem that had to be licked. It was done by shielding the entire 110-foot-diameter centrifuge chamber—walls, floor and ceiling—with 1/16-inch copper. To baffle electrical interference from the motor, the base of the gondola arm pivots in a trough of mercury.

Set in a circle around the centrifuge chamber is a series of research units: physiology, biophysical, biochemistry and gas analysis, pathology, and electronics laboratories.

Keeping Ahead of Plane Designers

"For the first time," explains Commander C. F. Gell, USN Medical Corps, Acting Director of the centrifuge center, "we will be able to gather information on actual performance in the realm of G forces. Previously, the study of human reactions in aircraft has always lagged behind the accomplishments of the aircraft designers. Now that situation is reversed."

Some of those youngsters on the carnival merry-go-round may grow up to exchange a gaudily painted, bouncing wooden steed for the pilot seat of an as-yet-undesigned jet or rocket plane. Then, thanks to the Big Wheel at Johnsville, they'll be able to fly a lot faster a lot safer. END

THIS IMPOSING BUILDING was designed specially to house the Navy's new acceleration laboratory. The human centrifuge itself was constructed by McKiernan-Terry Corp.

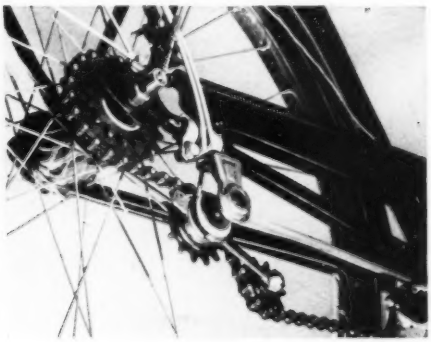
Transport Gets Wing Tanks

THE first transport to fly with wing-tip fuel tanks is the Super Constellation test plane pictured above. Previously used only on fighters, the tip tanks will be standard on turboprop-powered Super Connies now on order for the Navy. Each tank will hold 600 gallons of fuel to give the 450-mile-an-hour Lockheed plane long range, even though its new engines eat up 50 percent more fuel than the conventional ones.

When commercial turboprop air liners are built, the tanks will make possible non-stop flights from Shannon, Ireland, to New York. Each tank develops enough lift to compensate for the weight it adds.

Hill-Climbing Gear Gets Six Speeds Out of Three-Speed Bicycle

EVEN mountains aren't too much for bicyclists using the gear-conversion unit below. It is designed to improve the hill-climbing ability of bikes having three-speed transmissions by doubling the number of speeds available. It can also be used to provide a second gear on a standard bike.

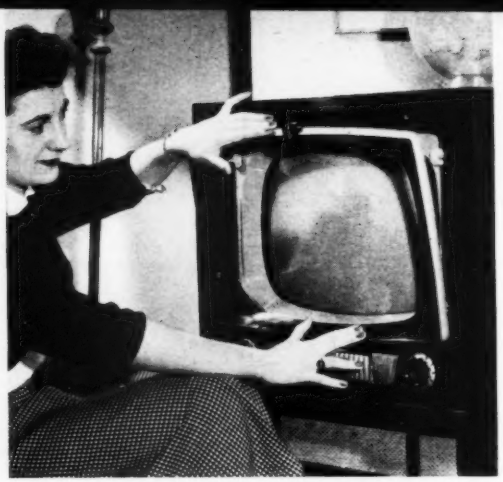


The unit consists of a large sprocket for the rear-wheel hub and two idler sprockets that form a clutch. A hand control moves an idler sprocket sideways to shift the bicycle chain between the regular rear-wheel sprocket and the large sprocket, giving an extra speed for each one built into the bike. Made by the Cycle Gear Co. of Birmingham, England, the unit is marketed here by Dawes Distributors, Cambridge, Mass.

Coated Eyeglasses Aid Pilots

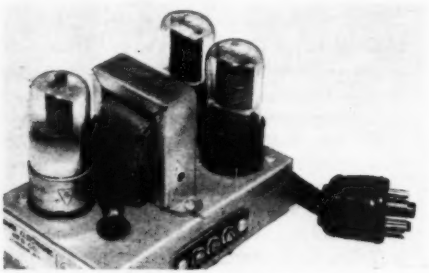
SPECTACLE-WEARING Air Force pilots can now see better at night. Their goggle-size eyeglasses are coated with magnesium fluoride, like fine camera lenses, to cut down reflection and loss of light.

What's New on Radio Row



TV Safety Mask Snaps Off

THE safety glass and decorative bezel can be removed from the front of this Emerson receiver so that the set owner can wipe picture-dimming dust and soot off the glass and tube face. No tools are needed to take off or replace the front. Cabinet catches hold the bezel securely when it is snapped back.



Amplifier Improves TV Sound

THIS push-pull amplifier adds better sound to a TV set. It plugs into most sets in place of a regular tube and can be used with the existing speaker or an auxiliary one. *Vidaire Television Co., Lynbrook, N. Y.*

Heat Strips Wire Insulation

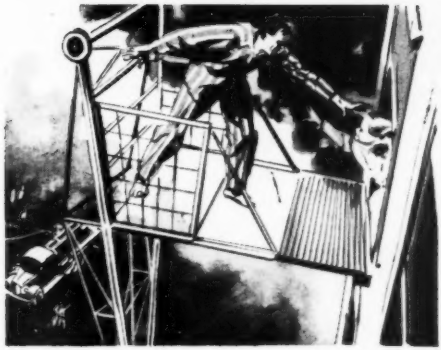
YOU don't have to take the insulation off this wire before you solder it—you just start right in and the heat of the iron melts the thin plastic coating, baring the wire for a good electrical joint. This not only saves time, but eliminates nicked strands and insulation creep-back. The plastic will not melt under normal circuit temperatures. The Nonstrip Wire is made in a range of sizes and coding colors. *Rex Corp., 51 Landsdowne St., Cambridge, Mass.*

Portable Intercoms Plug in House Wiring, Work Anywhere

YOU just plug these intercoms into home or office electrical outlets and messages are carried over the regular power lines. A suppression circuit quiets line noise when the units are on stand-by. *Vocaline Co., Old Saybrook, Conn.*

I'd like to see them make...

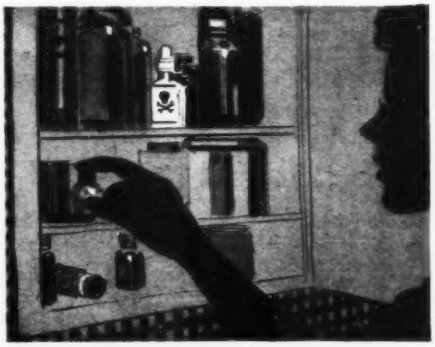
Everyone has his own pet idea of some gadget he would like to see in general use. What is YOURS? *Popular Science Monthly* will pay $5.00 for each one published. Use government postcards only. Contributions cannot be acknowledged or returned.



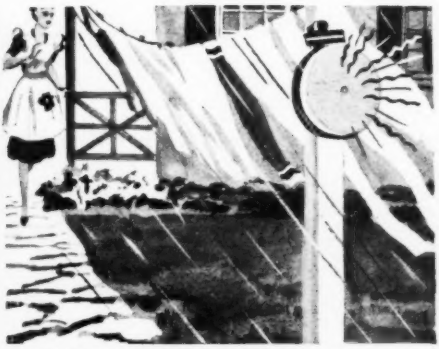
A FIRE LADDER WITH AN ELEVATOR CAGE on it, for quick rescue of several persons who were trapped inside a burning building.—*A. G. Shade, Springfield, Mo.*

CHANGEABLE, LIGHTED SPEED-LIMIT SIGNS for parkways. Centrally controlled, they would indicate speed best suited to varying weather and traffic conditions.—*J. G. Sheskin, NYC.*

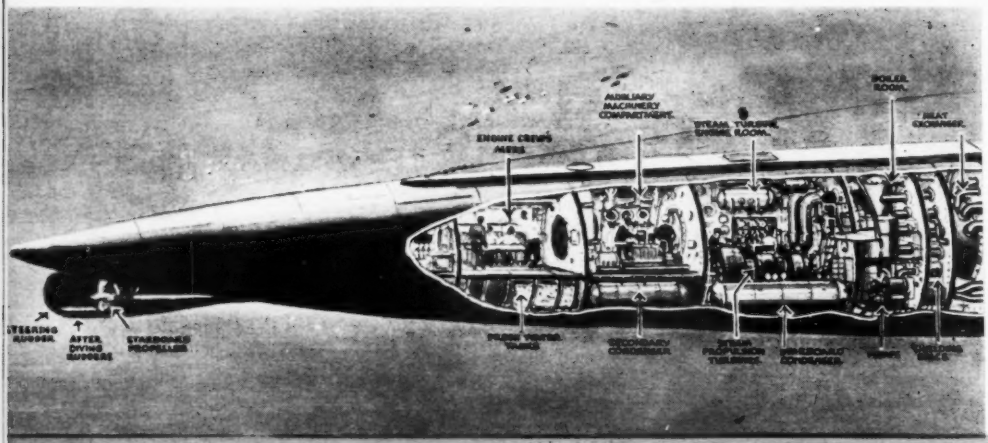
A TIMER FOR A TELEPHONE, which you could set when making a long-distance call, to let you know just how many minutes you had talked. —*Doyle Carnahan, Indianapolis.*



LUMINOUS-PAINTED MEDICINE BOTTLES for poisonous drugs, to prevent nighttime accidents caused by sleepily reaching for the wrong bottle.—*Allan Kalb, Newark, N. J.*



A MOISTURE-SENSITIVE ALARM, to hang on a clothesline pole, that would ring a bell and warn a housewife when it started to rain. —*Romeo Soucy, Manchester, N. H.*



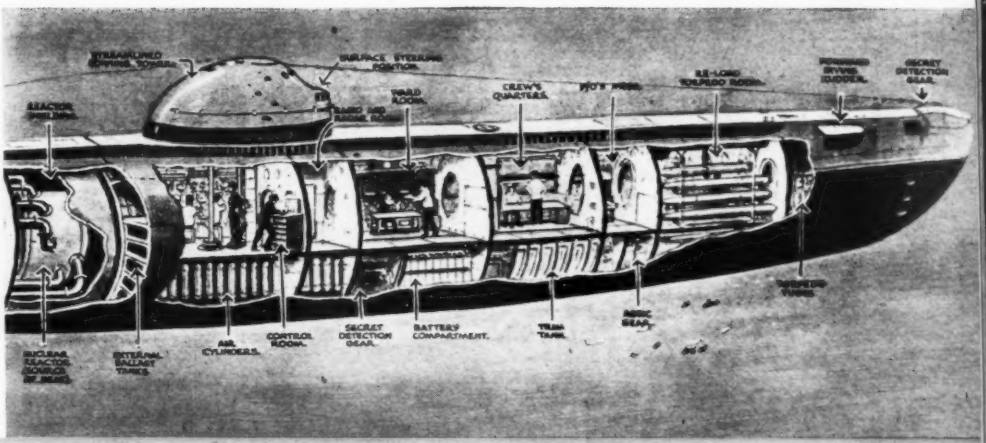
How Atomic Engine May Run Submarine

WHAT an atomic-engined submarine may look like is envisioned above by an English artist, G. H. Davis, in a drawing for the *Illustrated London News*. His sketch was inspired by British Admiralty plans to study nuclear propulsion, and by the U.S. Navy's more advanced progress toward its use.

While the ship pictured here is purely imaginary—actual designs are highly secret—it is held to be in keeping with known

College Swimmers Run Relay Race Under Water

WOULD athletes use the same motions, in running and other sports, if water instead of air surrounded them? Ideas differed until three MIT students, all crack swimmers, tried the novel experiment in the college pool. Through a side window below the surface, a cameraman took these photos of an underwater relay race. Many movements proved graceful, slow-motion counterparts of familiar ones, but there were unforeseen exceptions; a runner "naturally" led with arm and foot on the same side, instead of on opposite sides as in air. The athletes averaged 20 seconds under water and, by expelling all air from lungs, could stay on the pool floor without weights.



general principles of atomic engines. Heat from a chain-reacting pile, whose shielding protects the crew from radioactivity, makes steam to run a turbine and turn the vessel's propellers. The drive may be through reduction gears or through an electric generator and propulsion motors.

Atom-powered subs will cruise vast distances without refueling and, because their engines consume no precious oxygen, run submerged for prolonged periods. The world's first, the USS *Nautilus*, for whose hull the Navy has already awarded a contract, will be propelled by a Westinghouse atomic reactor of which a "land-based prototype" is currently under development. General Electric will soon build a more radical liquid-metal-cooled reactor that, after trial and necessary modification, will be directly installed in another U.S. sub.

MECHANICS OF LIVING

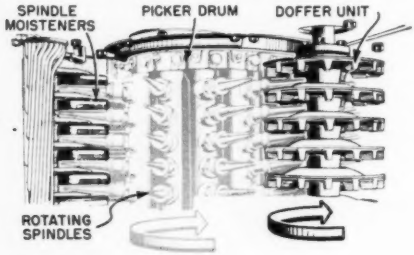
How a Cotton Picker Works

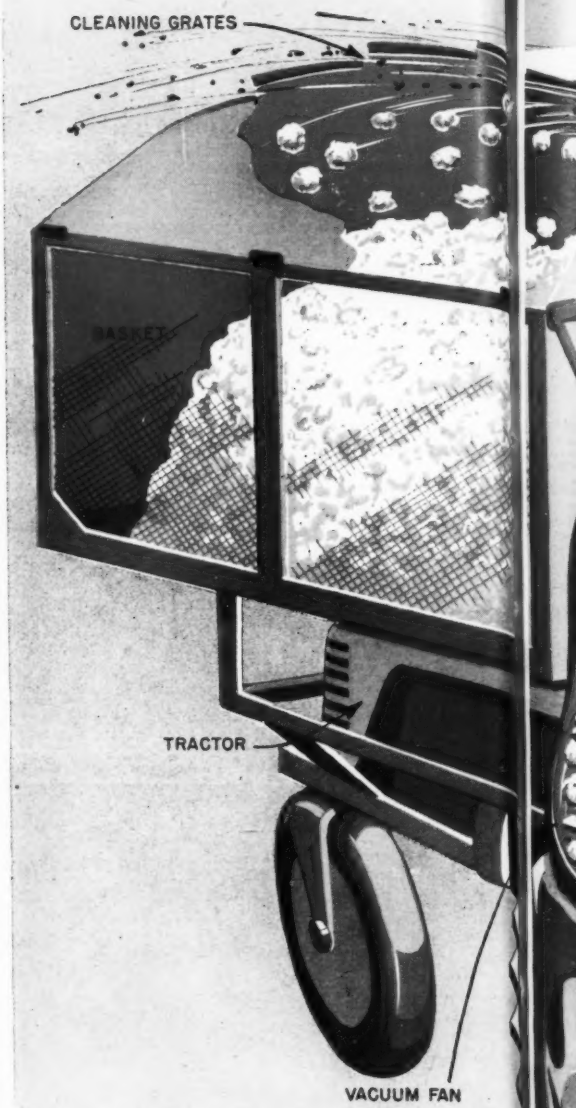
JULY is the month when the South's annual cotton harvest begins. It is a long harvest because cotton bolls don't all ripen at once. Each of the great, flat fields must be picked over two or three times before the season ends. But as soon as enough snowy blooms are visible to give the signal, men start methodically driving big mechanical cotton pickers up and down the long rows of plants. Each picker plucks two tons of ripe bolls a day, or 60 times as much as the average man could pick.

Inventors were trying to build practical mechanical cotton pickers as long ago as 10 years before the Civil War. The goal was not achieved until 1935, and mechanical pickers have been in general use only since the end of World War II.

There are three principal makes on the market now, all operating somewhat similarly. The picker shown on these pages is made by International Harvester. It is mounted on a tractor modified to drive backwards.

BOLLS ARE PLUCKED off plant by two moistener-spindle-doffer units mounted on front of cotton picker. Drawing below shows a side view of one, with the front end at the reader's left.





AS THE PICKER MOVES along a row (see diagram at upper right on facing page), its spring-loaded lifters guide the plants into two revolving drums studded with rotating, barbed spindles, 300 to a drum. The spindles, moistened at each revolution, are so spaced that they pluck the puffy ripe bolls but let the unopened green ones pass. Revolving rows of rubber doffers then snatch the blooms and drop them to two pipes which function like vacuum cleaners. A vacuum fan sucks in the blooms, blowing them up to the picker basket.

DIRT AND LEAVES are shot out through cleaning grates (left) as the cotton is blown into the basket.

HYDRAULIC PUMP, controlled by pedal on which driver is resting his right foot, raises and lowers picker-drum unit, and also dumps basket. Driver determines which job the pump is to do by means of selector-valve control rod.

Now You Too Can Own a Yacht

By Robert J. Whittier

ONE of these summer days you may glance down the river or out over the bay and notice a jaunty little cabin cruiser coming your way at a swift clip.

"Man!" you muse as she draws close enough for her details to become clearer, "I sure wish I could afford a rig like that!" The trim craft whizzes past and you look after her enviously. Instead of a steaming cloud of engine exhaust swirling behind her, you're astonished to see an outboard motor on the transom. Maybe you can afford her, at that!

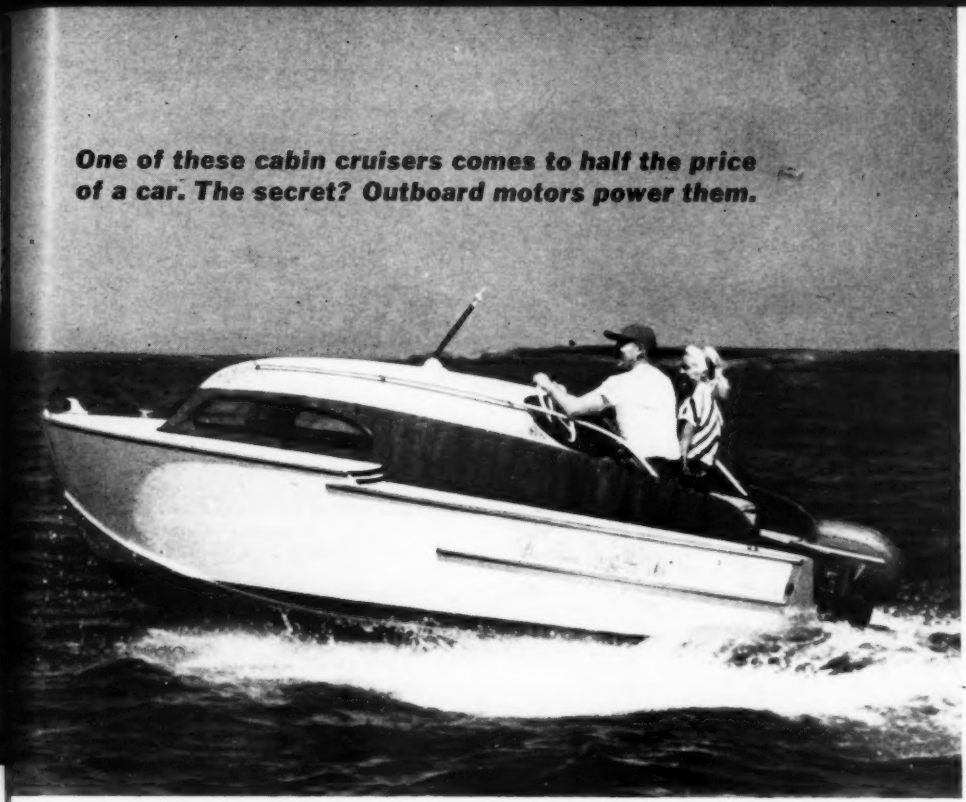
With her 25-horsepower engine hung over the

For the outboard cruiser—a cabin cruiser powered by an outboard motor—is currently invading the boating world with as much promise as Henry Ford's Model T invaded motordom 40 years ago. Outboard enthusiasts predict that it will bring cruising within the reach of the average American just as the "Tin Lizzie" brought him motoring.

If you're in moderately comfortable cir-

A LARGE COCKPIT for day trips is feature of this 25-hp. cruiser. Cruising outboards run from about 10 to 33 horsepower, depending on boat's size, design, load, performance.

THIS 19-FOOTER was built from blueprints. Note how 9.8-hp. outboard sits in stern well. Outboard cruisers are 16 to 20 feet long, cost from hundreds to over a thousand dollars.



stern, this cabin cruiser packs a maximum amount of living space into her 17 feet of length.

cumstances you can buy a ready-made outboard cruiser today. If you're short on cash but handy with tools, you may still be able to launch your own home-built craft next season.

Outboard cruisers aren't new—but they've been pretty rare. Now two factors have suddenly brought them into the limelight. The ever-increasing cost of inboard-engine craft is forcing many yachtsmen to look around for more economical ways of enjoying life afloat. And during the last few seasons several outboard-motor manufacturers have introduced larger, more versatile models that are nevertheless reasonably priced.

Boats Come Complete or in Kits

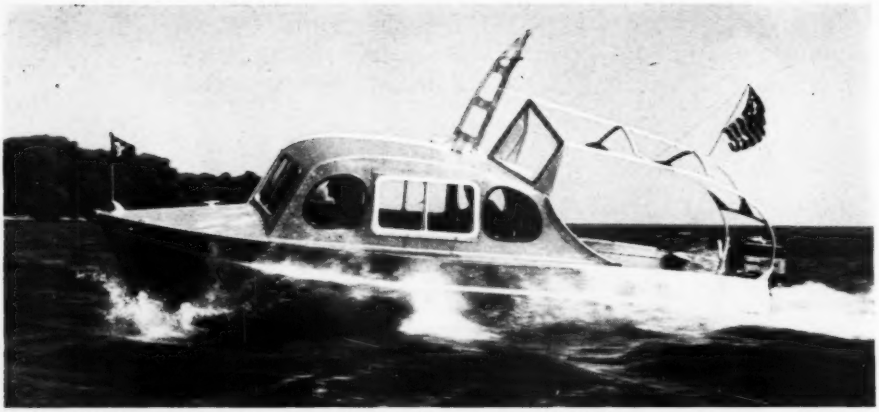
Several firms now make these boats. Some companies also offer construction kits with all parts cut out and ready to assemble with common hand tools. Or you can get a catalog of boat plans from the Douglas Fir Plywood Association, Tacoma, Wash., for a dime.

What is the appeal of this newcomer? In a nutshell, it's this: The outboard cruiser combines the inboard's cruising abilities (except for offshore work) with the outboard's portability, ease of handling afloat and ashore, and relative economy.

Although the average length of a cruiser is only 18 feet or so, there is a surprising amount of room aboard. No space has to be taken out of cabin or cockpit for a bulky inboard-engine compartment. It is as though the engine were removed from an automobile and clamped to the rear bumper—leaving that much more usable space within the car's body.

The typical outboard-cruiser cabin has ample sitting headroom and is fitted out with two bunks, a small stove, a portable icebox and storage space for enough supplies and equipment for several days afloat. Often a toilet is installed. The cockpit is clear, well adapted to sport fishing, and roomy enough for several occupants. Two people can comfortably spend several days afloat and a whole party can make daytime excursions without being crowded.

A "bare" outboard cruiser—with the engine removed—is small and light enough to



ALL-ALUMINUM EXPRESS CRUISER is 18 feet 4 inches long, has 6-foot beam, knocks out 25 m.p.h. with 25-horsepower engine. Cruiser-size outboard motors cost $250 to $500 new.

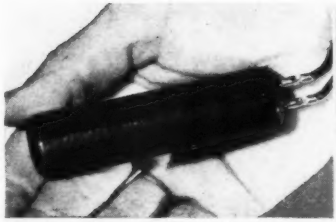
be readily hauled out of water on a two-wheel boat trailer. Thus the owner avoids marine railway and boat-yard charges by taking his craft to a barn or large garage for winter storage. Most important, he is not confined to one body of water.

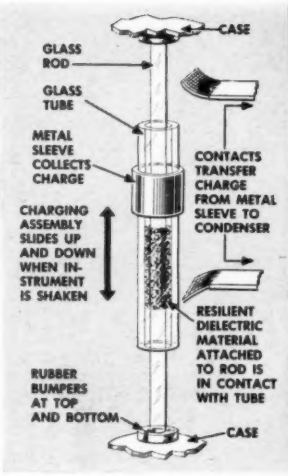
It is common for an outboard-cruiser owner to spend one week end on a salt-water bay and the next on a large lake far inland. A particularly attractive feature of these boats is that on long cross-country tows, they can be parked by the roadside and used as snug overnight shelters. At sunrise you promptly launch the craft and set out on a long day of fishing. Even if it rains, you can still fish in comfort. It's the nearest thing yet to the convenience of the turtle's shell.

Because outboard motors tilt if they strike underwater obstructions, it is safe to venture into interesting backwaters where no inboard skipper would dare go. Rivers with their sand bars, swamps with their weed beds and snags, and salt-water creeks whose depth varies with the tide don't scare the outboard cruiser. Should weeds foul the propeller, the motor is merely tilted so you can reach down and pull them off. There is no need to tow a dinghy for landing, either, since you can run these boats right up onto a beach without damage.

In cost, the outboards also have it all over the inboards. They have no need for exhaust plumbing, engine girders, electrical systems, stuffing boxes and so on. The motors themselves cost less than inboard engines, and because they are readily removed from the boat, servicing and repairs are easier and more economical. At the same time a lighter engine means a lighter hull—and that saves money, too.

KITS, TOO. This 19-foot model, made by a famous builder of inboard motorboats, can be bought ready-made or in kit form. Most kits cost 30 to 50 percent less than finished cruisers.





Baby Uranium Finder Needs No Batteries

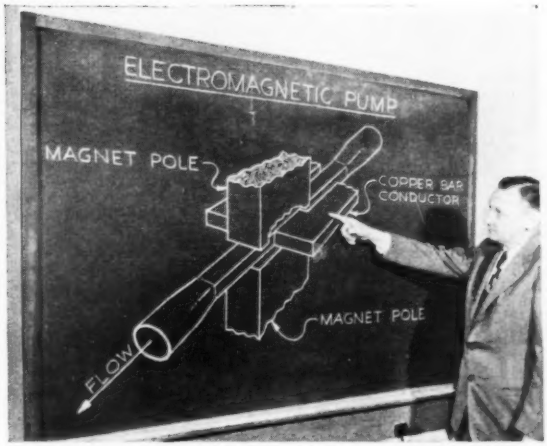
ONLY an inch in diameter and four inches long, a tiny Geiger counter for uranium prospectors dispenses with batteries. Before use (far right), you merely shake it up and down 20 to 30 times. This charges an energy-storing condenser by operating a simple frictional generator of static electricity (diagram). Including headphones to listen for telltale ore-detecting clicks, the outfit weighs less than half a pound. Called the Geiger-Mite, the counter is sold at about $30 by Morgan Instruments Co., Canoga Park, Calif.

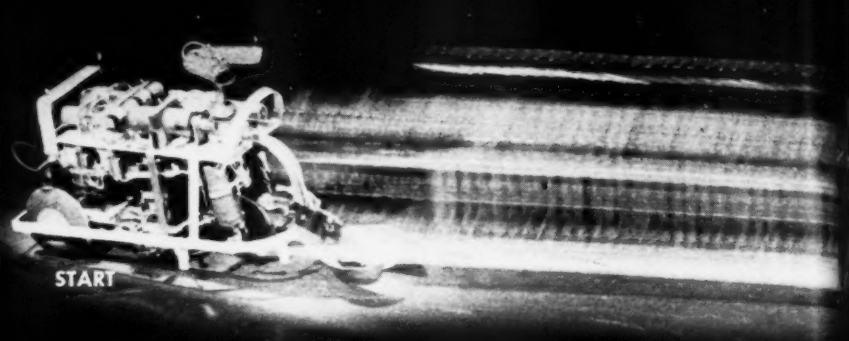
2-Engine Plane at Bargain Price

THE Twin-Stinson, which can cruise at 150 miles an hour with four passengers, is expected to sell for less than $25,000. Piper Aircraft plans to have the plane, which is powered by 135-horsepower Lycoming engines, in production by 1953.

Magnetic Trick Used to Pump Liquid Metal

DESIGNERS of power-generating atomic piles favor liquid metals—like sodium and potassium, which liquefy at moderate temperatures—for cooling and heat transfer. Electromagnetic pumps, with no moving parts, solve the problem of how to circulate them. In one successful type (right), direct current passes through liquid metal in a pipe, while magnet poles set up a magnetic field. This makes a "motor" whose "armature," the liquid metal itself, is propelled by magnetic forces.



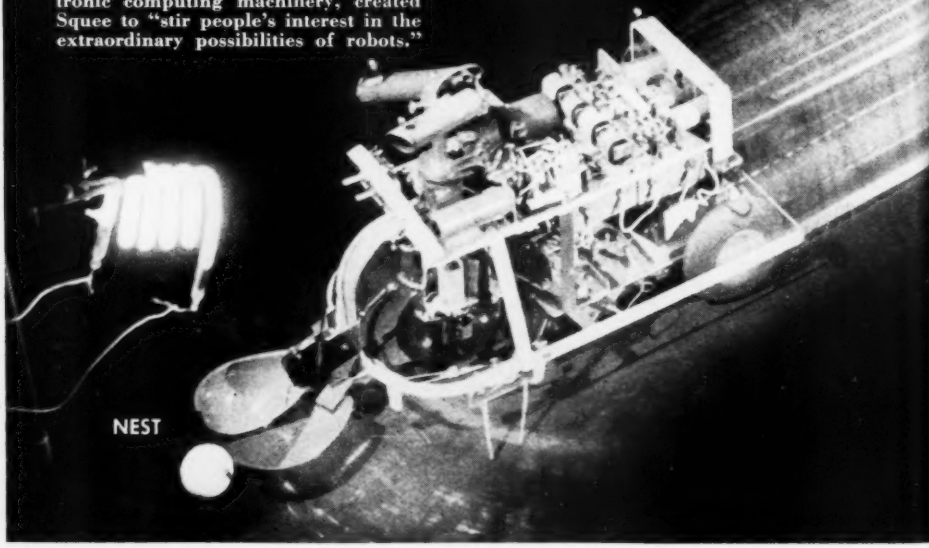


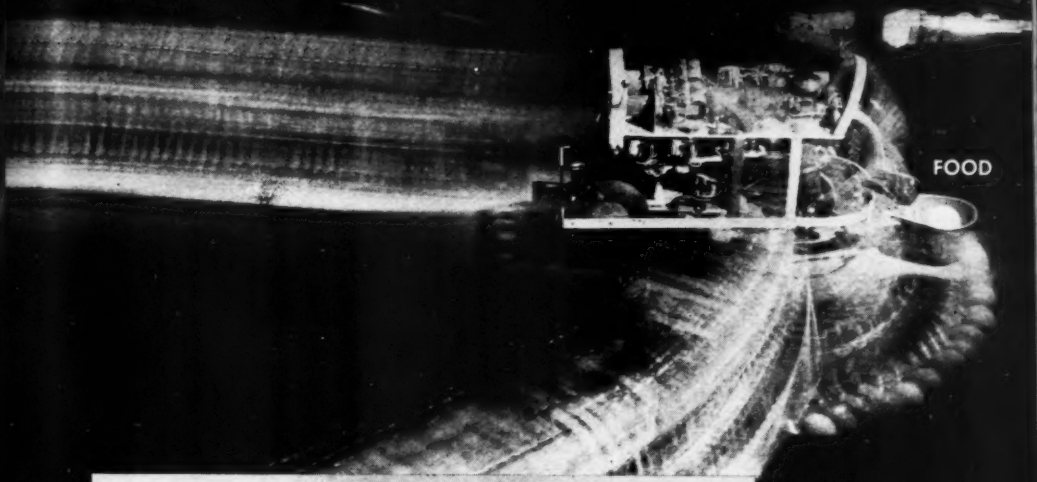
Robot Squirrel Hunts His Own Food

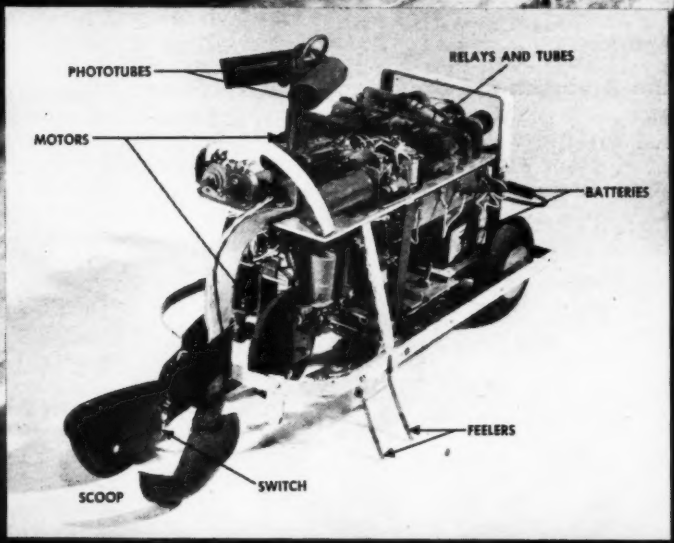
EDMUND C. BERKELEY, an expert on electronic computing machinery, created Squee to "stir people's interest in the extraordinary possibilities of robots."

When you shine light in Squee's phototube eyes, this little electronic squirrel goes nuts.

PSM PHOTOS BY HUBERT LUCKETT







LIKE REAL SQUIRREL, Squee has sensing organs (phototubes, switches, feelers); acting organs (three motors to drive, steer and operate scoop); and thinking organs (12 relays, seven vacuum tubes). Powered by one 12-volt wet battery and two 67½-volt dry batteries, what Squee really eats is electricity.

THIS electronic animal behaves like a real squirrel. It looks for a nut, runs to it, picks it up, carries it to a nest, then hunts for another nut. The nuts that it collects, however, are usually golf balls, and the nest to which it takes them is an aluminum plate. The sensitivity of Squee's phototube eyes accounts for his action. They respond differently to a steady light than to a flickering light. Whoever runs the squirrel must place a steady light (in this case a flashlight) behind the nut. When the nut enters the scoop, the squirrel's circuits are switched to make him search for a flickering light placed over the nest. A gas-filled lamp that flashes on and off 120 times a second then lures Squee to his nest, where he deposits the nut—and starts all over again.

PONTOONS have one-piece decks and bottoms. Overhanging deck stops spray, and runners underneath make beaching easy.

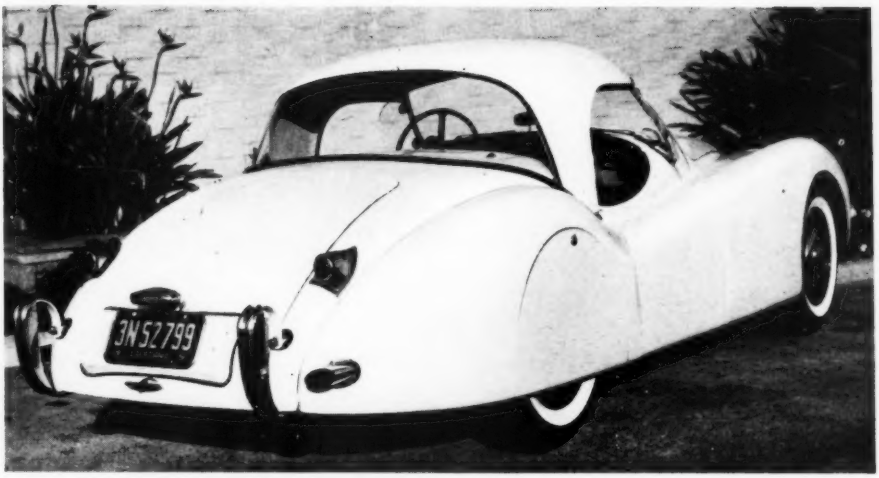
TANDEM water bikes and lightweight models for children are made in addition to standard type.

Pedaling Up the River on a Sunny Sunday Afternoon

THE seagoing bike above is said to be unsinkable and swamp-proof. The steering post is linked directly to a front rudder and there is direct drive from the pedals to an eight-bladed paddlewheel that puts water behind you fast. The maker, Selleck Watercycle Co., New London, Conn., reports it can go as fast as a rowboat with less work.

Slim Hull Hitches Plane Ride

THIS narrow, knifelike hull for flying boats—slimmest ever built—was designed for big amphibians of the future. It is shown above being flight-tested on a Grumman Widgeon specially modified—the bow and underbody were chopped off—so that different hull types can be easily bolted in place. Designed by the Navy and Convair and built by Edo, the hull has a window just behind the main step from which movies are made of the water flow.



Hard Top Converts Convertible

JAG owners can further convert canvas-topped convertibles with this lightweight hard top made of Fiberglas. Only two holes need to be drilled to install it, one on each side of the car alongside the seat. The rear window is of Plexiglas. The whole business weighs only 21 pounds, is easy to lift into place, and can be put on or removed in a few minutes. A builder of plastic car bodies, the Glasspar Co., Costa Mesa, Calif., makes it. A Jaguar with a regular hard top made as part of the body appeared this winter (PSM, Feb. '52, p. 130).

75 years ago this month

Popular Science Monthly reported:

"A PREPARATION of tungstate of soda and starch has been highly recommended for rendering muslin dresses uninflammable. At a recent trial of it in London, the dress fortunately being placed on a dummy, the saturated fabric readily took fire, blazed up, and was quickly consumed."

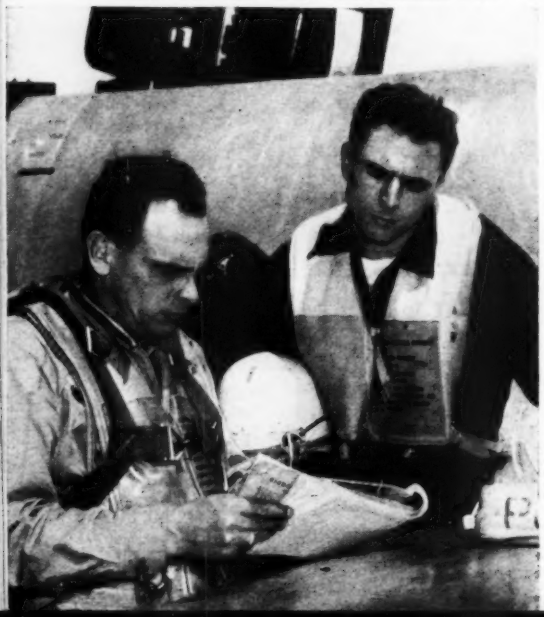
Sundial Is Star Dial, Too

DAVID THOMSON invented the celestial timepiece above. Two nested brass rings are marked for the days of the year and for time. To check his watch, Thomson takes a fix on the sun or the North Star, twirls the rings and reads them. Time is Thomson's job—he's a time-study engineer for Buick.

How You Become a Flying Radar Man

You have to learn to see through a scope instead of your eyes to qualify as an observer for one of our new jet interceptors.

FLOYD FEW, right, confers with his jet pilot at Tyndall Base, Florida, where four weeks' final training follow graduation from Connally. He's now Second Lieutenant Few.



By Phil Gustafson

AVIATION CADET Floyd J. Few was sweating it out on the hot seat.

Lightproof curtains blacked out the after fuselage of a high-flying B-25, where he sat bundled up to the ears in flight gear and parachute. Strapped stiffly erect in a bucking steel-backed seat, he frantically manipulated controls on a radar set.

Somewhere else in the sky was an elusive target plane. He could see it only as a blip, a bobbing little oblong spot of light, on his radar scope. His task was to guide the B-25 to it, strictly on instruments. Up ahead, a pilot's hands were on the controls—but it was Floyd who was actually flying the B-25, by telling the pilot over the intercom to climb, dive or turn.

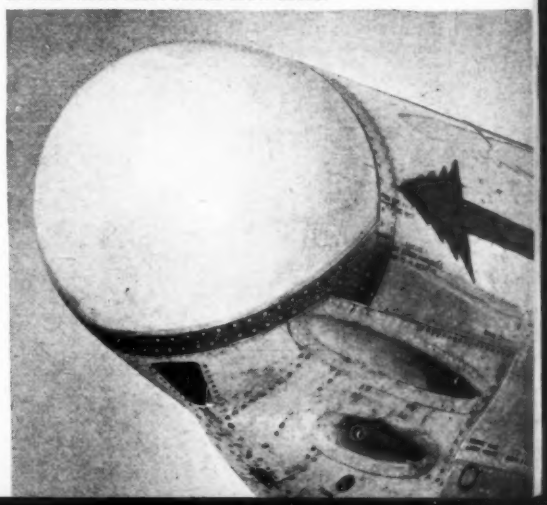
The target plane simulated an enemy bomber headed for a U. S. city; the propellered B-25 represented one of the Air Defense Command's jet interceptors that

Radar observer, in after seat of jet interceptor, glues his eyes to this scope to track enemy.

would actually be rocketing through the sky in hot pursuit of it. And Floyd was a student learning the role of the radar observer who would be in the jet's after seat. All had seemed to him to be going well as the B-25, trailing by several thousand yards, closed in for the kill.

But suddenly the target plane went into violent evasive maneuvers—prompted by radio directions from a grinning instructor sitting behind Floyd in the B-25. It veered, dived, climbed, circled, weaved. Floyd fought to keep it in the searchlight beam of his radar antenna. It was like trying to follow a wildly intoxicated firefly with a telescope while riding a bucking bronco. The B-25's gyrations pitched him forward, backward and sideward. He could hear an-

HERE'S BUSINESS END of interceptor as it would close in for kill. Guns beneath radar-dome nose are always "hot" (loaded) and ready for action when alert sends crew aloft.



other student aft being good and sick—but no time for him to be!

Watch altitude, speed, range. Keep chattering instructions to the pilot. Did I remember to come out of that bank? Something's gone wrong—the target's drifted off the scope. Then a cold, slow drawl from the pilot:

"If you leave the plane in this dive, Mr. Few, we'll hit the ground in just about 90 seconds."

Undergoing ordeals like Floyd Few's are hundreds of students being trained as radar observers at James Connally Air Force Base near Waco, Tex. After graduation, each man will be teamed with a pilot to man a two-place interceptor for all-weather flying.

They See by Radar

Radar serves as the eyes of these two-man teams. Fog, rain or darkness makes no difference to them. They can take off and trail an enemy craft blind, shoot him down without ever seeing him and come back and land on a runway on instruments. All daytime interceptor units are being converted into these all-weather squadrons.

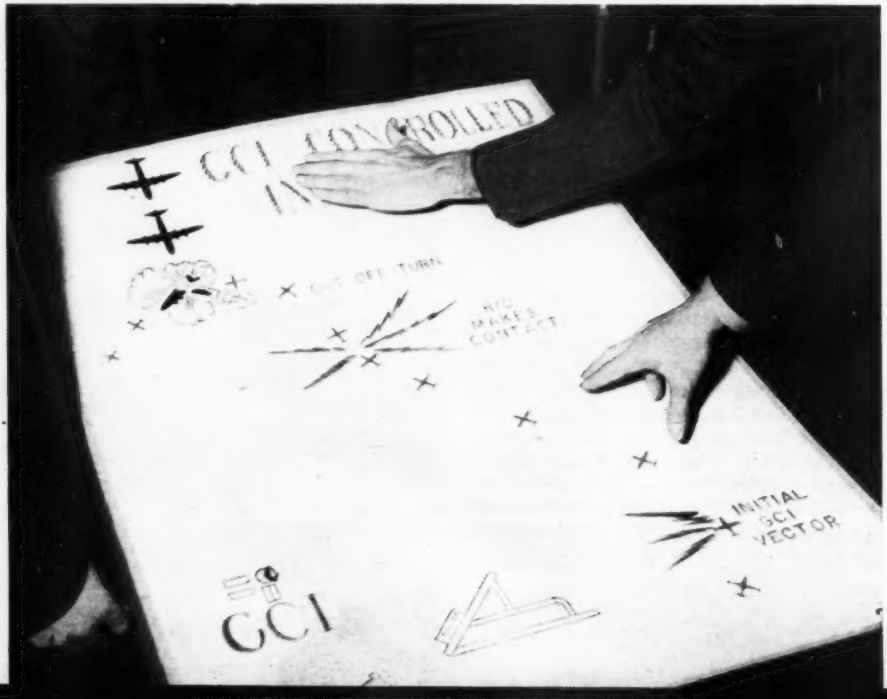
From a controller at a ground radar station comes the alert that sends them streaking aloft in minutes' time. In the air, they are headed toward the target by his radio voice instructions. The jet's radar observer takes over when he sees the target on his scope. Finally, when the jet is within firing range, the pilot picks up the target on a short-range radar of his own—and acts as the gunner to destroy it.

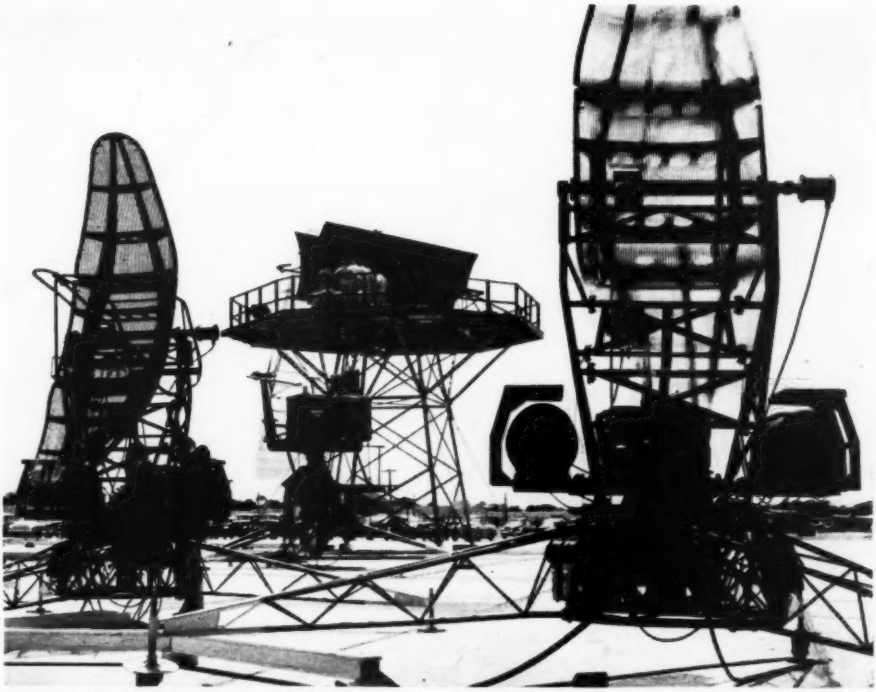
Pilot, observer and radar controller are the human links in a gigantic atomic-age system of radar warning and interception, thrown up by the Air Defense Command to guard the U. S. day and night against long-range air attack. Like spots on a Dalmatian dog, its radar stations and nearby interceptor bases dot the nation's map. Improved new interceptors are on order and some have been delivered.

For some time most squadrons will have Lockheed F-94s, now beginning to arrive at bases with increased power—and rockets. A later type, of which the first are showing up, is the F-89, with 16 five-inch rockets and six 20-mm. cannon. And the Air Force is going all out on a huge program to train the men who will fly them.

Mass production of radar observers has been under way at Connally since August of last year. Seven days a week, three times a day, they buzz around the balmy Texas atmosphere in B-25s converted into flying classrooms. Veteran radar men of World War II's night-flying Black Widows and

HOW ENEMY BOMBER is intercepted is shown on chart. Controller at Ground Controlled Interception (GCI) starts jet toward target. Then jet's radar observer (R/O) takes over.





GROUND RADAR STATION gives alert that sends jet planes streaking aloft to investigate any unidentified plane. It may be an airliner off course. It could be an enemy A-bomber.

Beaufighters, recalled from civilian life to serve as instructors, are giving a course superior to any they ever had themselves.

The 25-week training program qualifies cadets for observer's wings and commissions. So many volunteer for it, before or after enlisting as airmen, that Connally gets the cream of the crop. All are in their early twenties. They average 3½ years in college. Most have had a fling at some profession. In the first group at Connally, one was a practicing lawyer, one an anthropologist, one a former smoke-jumper, another had a master's degree in theoretical physics.

Crammed into their training course are 465 hours of basic military training, then 426 hours of intensive study, and finally 138 hours of flight training, including 18 mis-

FUTURE RADAR OBSERVERS get 426 hours of academic training at Connally Air Base. Below, members of a class learn the meaning of the lines and symbols on a weather map.

LEARNING the intricacies of navigation, a cadet at Connally solves a problem with the aid of a dial computer. Other courses give him a grounding in electronics and radar.

sions in the air. It's the snortest trip to a commission and to jets—but it's not recommended for those who like to do things the easy way.

To see what it's like, I flew down to Connally, picked out one student and followed him through the whole routine—our friend Floyd Few, who happened to be the first to finish his training in the air. A slender black-haired, good-looking kid from Taylor, N. C., he'd graduated from North Carolina State, enlisted in the Navy in World War II, and got into Annapolis by competitive examination. He dropped out to take a post-war job, but after Korea he put in for cadet training, re-enlisted and waited his turn. Called to Connally, he found he'd bought himself a package.

Zigzag lines mark new wings for radar man.

Up at five in the morning, young man. Dress and police your quarters. Have breakfast. Race off to classes. Assemble for lunch. Rush around the base to more classes all afternoon. Then drill. Then supper. Then study. Taps at 9:30. Do it again the next day and the next, always with something added.

And for good measure, the traditional hazing for all fourth classmen:

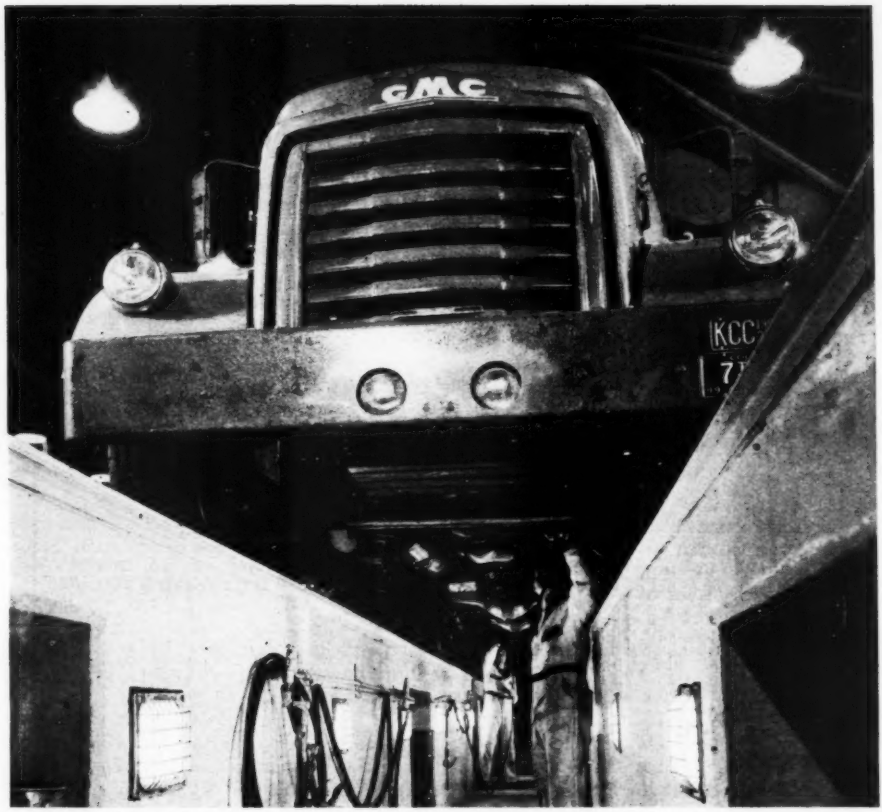
"You'll march to your classes, Mr. Few." "Give yourself orders for each move." "Forward march." "Left face, march." "Right face, march." "Turn square corners."

Then, after evening chow, he stood stiff as a ramrod on the commons, taking orders from upperclassmen:

"Pull in your chin, Mr. Few." "Wipe off that smile, Mr. Few." "Give the radar observer's code, Mr. Few." "Are you confused, Mr. Few?" Anything he said was wrong, of course. Long military drills were the penalty. Floyd didn't mind so much. He'd been through it all before as a plebe.

[*Continued on page 206*]

CHALK TALK helps instructors plan the day's problem for students who will board B-25s, serving as flying classrooms, to be put through their paces in practice interceptions.



In a block-long lubrication pit, hoses supply grease and motor oil from buried storage tanks.

They Call It the

World's Best Truck Garage

The gates never shut in this super-service center. Complete checks take four hours, major overhauls 48. It pays off in speed and safety.

By John Wesley Noble

JACK RIESING mates tires. He also builds donkeys, cures "sick horses," reads smoke signals to keep within the law, and installs coat hangers in truck cabs to please finicky drivers. Sometimes he chases huge tow trucks 200 miles off into Wyoming ground blizzards to rescue stranded rigs.

Riesing, 41, a slender, professorial-looking mechanic, is the new super of the huge maintenance shop of Pacific Intermountain Express at Denver. It has been selected by *Transport Topics*, published by the American Trucking Associations, as the best motor-carrier garage in the United States for a

BIG, BRIGHTLY LIGHTED servicing shop is one of many that make up sprawling PIE garage in Denver, where every part of a tractor or trailer can be adjusted, repaired or replaced. Floors are radiantly heated against Denver's cold winters. Garage is staffed with 200 men.

fleet of more than 700 vehicles. Many experts call it the world's best truck garage.

When Riesing "mates tires," he sees that all on one truck are identical for balance. The "donkeys" he builds are the hostling type, shown in use in one of the photos. The "sick horses" he cures are ailing trucks.

HOSTLING DONKEY, developed by PIE, hauls huge trailer through spray wash. Rigs are cleaned on every trip east and west—cutting down rust and the need for paint jobs.

And "smoke signals" must be "read" to make sure the exhaust stacks don't belch more smoke than the law allows.

PIE drivers work relays of approximately 250 miles each over the sprawling system from San Francisco and Los Angeles to St. Louis and Chicago, but the massive silver-and-red rigs chaingang straight through on a never-ending schedule. By the magic of Riesing's 14-acre plant, through which rigs rumble at the rate of 50 a day, PIE's 276 tractors maintain an *average* of 25 miles an hour, 24 hours a day. That includes shop time, emergency road stops, and such feats as pushing fully loaded vans over 7,135-foot Donner Summit during blizzards.

Shop Could Build a Whole Truck

On every trip through Denver each truck and trailer is washed and serviced without even shifting its load. Any minor defects, such as rattling windows, a defective windshield wiper or faulty injector, are fixed at the driver's request. If a major overhaul is needed, 48 hours are allotted.

The Denver plant, a machinist's paradise of small specialty shops, does every bit of the giant line's repair and overhaul. Riesing's men assemble their own engines and subassemblies—fuel pumps, injectors, cylinder heads, piston and connecting-rod units. They have frame-straightening machinery, an elec-

TRACTOR UNIT gets a quick check on the dynamometer—first step in four-hour trip through shops. Foreman in foreground is watching dials of analyzer, with driver's logbook in hand. Engine should deliver 124 horsepower when truck does 40 miles per hour.

tric shop for overhaul of generators, regulators and starters, a separate welding shop, sheet-metal and woodworking shops, and a paint-spray department. The machine shop has enough equipment to build a whole tractor or trailer.

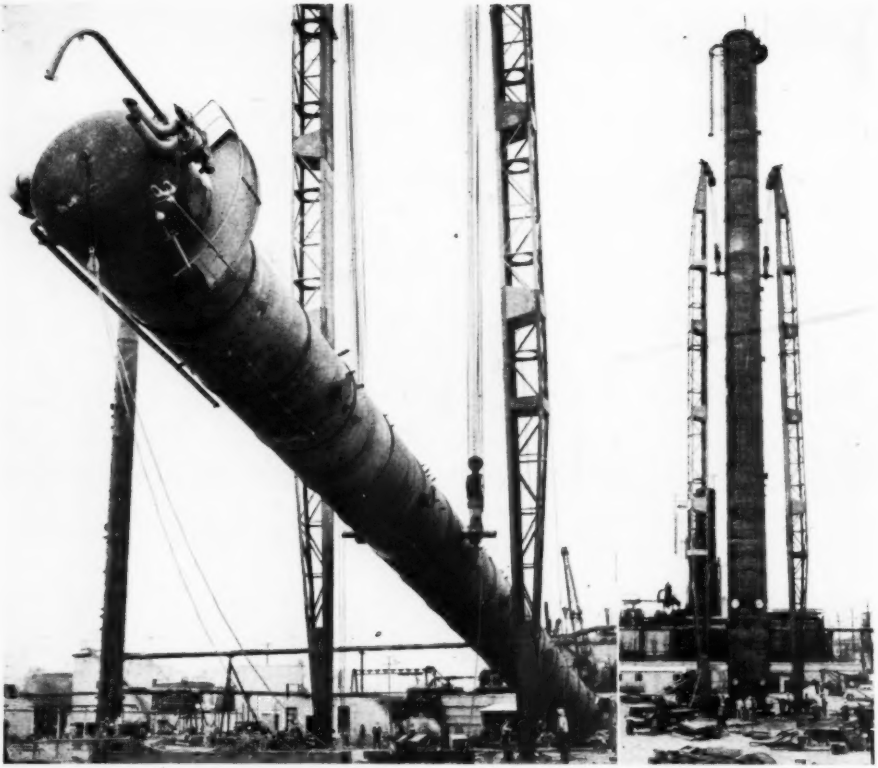
Riesing also must worry about paint jobs, road breakdowns, tire wear in extreme cold and heat (PIE crosses deserts, too), brakes, first-aid kits, wheel alignment—a worry for every part a truck-trailer has. And PIE has 531 trailers in operation.

60,000 Miles Without a Breakdown

Preventive maintenance is the only answer. By treating the trucks like airplanes, including a complete engine overhaul at least every 125,000 miles, the company is tops in efficiency of operations. Some of its amazing records are: 5.29 miles per gallon of fuel for the entire fleet, 60,000 to 65,000 miles between road failures on trucks, up to 58,000 miles per new tire, and a remarkable 46,000 to 47,000 miles per recap.

Riesing learned 10 years ago, when he was a hostler and grease man in the shop, to listen carefully to the drivers and to follow their suggestions. Contented drivers have established PIE as a long-haul truck line noted for its drivers' courtesy and the best traffic-safety record in the country—with gold trophies to prove it. END

JACK RIESING plots 48-hour major overhauls at central dispatch board. Each tab on board is load of freight being hauled by PIE somewhere between Midwest and California.

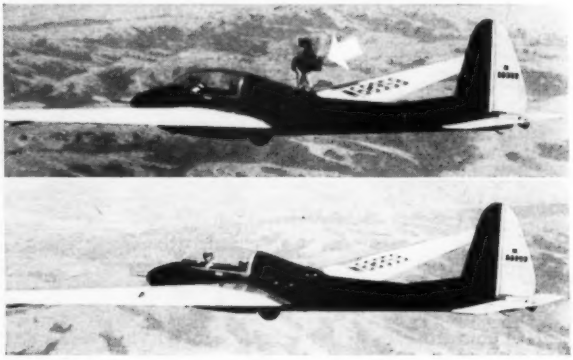


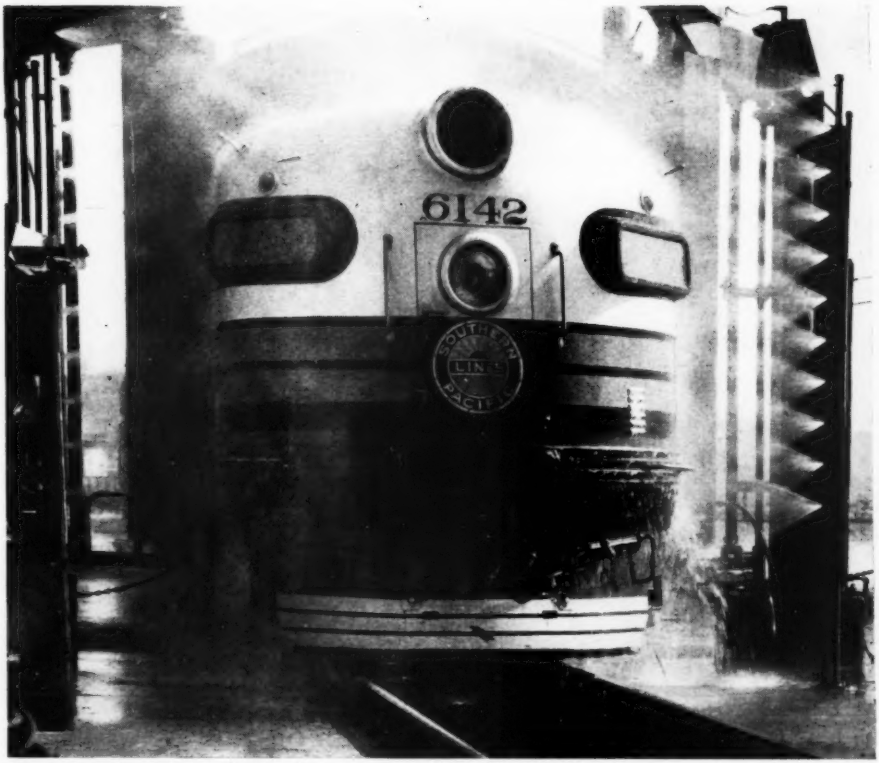
Tall Tower Takes to the Air

How do you stand on end a 200-foot-long steel column weighing 270 tons? Engineers raised this one by inserting a three-ton steel rod crosswise just above the center and hauling away with a Diesel hoist. The job took less than 2½ hours. Between masts braced by guy wires, the column starts up (left above) and ends in vertical position (right above). It will serve as a refining tower for aviation gasoline in the Standard Oil plant at El Segundo, Calif.

Disappearing Engine Boosts Sailplane Aloft Without a Tow

No TOW is needed to launch this self-powered sailplane. A 40-horsepower auxiliary engine (upper view) enables it to climb to 12,000 feet. Then the retractable engine disappears into the fuselage (lower view) and the pilot, Ted Nelson of San Leandro, Calif., enjoys the sport of sailing his plane as a motorless craft. Gliding in still air at 45 miles an hour, the lightweight sailplane loses less than 200 feet of altitude a minute.





Spectrograph periodically checks on fitness of big Diesels like the one getting a bath above.

Light Waves Point Out Engine Troubles, Pronto

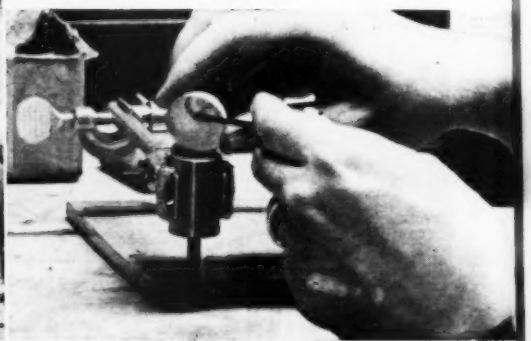
A 6,000-HORSEPOWER Diesel eased to a stop on the Southern Pacific's service tracks in Los Angeles. A mechanic swung aboard, drew samples of lubricating oil from its four crankcases and delivered them to a trackside lab. Technicians analyzed them with a spectrograph, as well as by other physical and chemical tests, and promptly reported the diagnosis:

"Hold locomotive. Cylinder liners in No. 3 engine are wearing. Check."

Spectrographic analysis now helps to avert breakdowns, delays and costly repairs. How it aids in heading off trouble is pictured on the following page. The spectrograph reveals the kinds and amounts of foreign particles in the oil. It does this by analyzing the light given off by the sample when burned, since each metal burns with its own characteristic colors—or "lines"— in the light spectrum.

In the example mentioned above, a heavy chromium line in the spectrum of oil from No. 3 engine showed wear of its chromium-plated cylinder liners. *(Please turn the page for more pictures.)*

2 REDUCING OIL SAMPLES to ash, by heating in crucibles, puts them in suitable form to be tested with spectrograph. One of oil samples is being poured into crucible in view above.

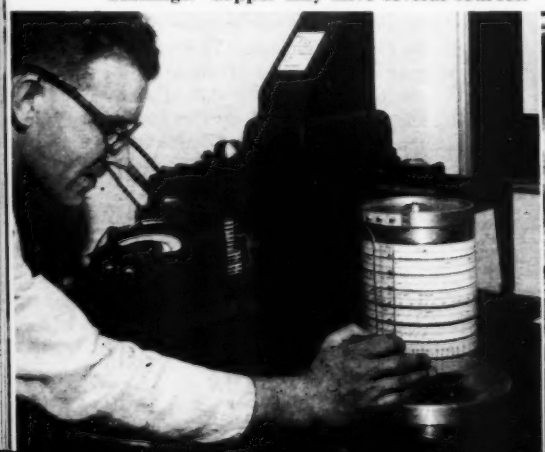


1 MAINTENANCE MAN takes lube-oil sample from one of locomotive's engines. Bottled samples go to lab for spectrographic analysis, in addition to viscosity and chemical tests.

3 ASH FROM OIL SAMPLE goes into hollow electrode of spectrograph. When electrode is replaced in instrument and used to form arc, analysis of colors in arc reveals metals present.

4 TELLTALE LINES of color identify foreign metals. Density of line indicates quantity present. Silver could come only from wrist-pin bushings. Copper may have several sources.

5 MAIN BEARINGS of Diesel crankshaft show wear (outlined by markings) detected with aid of spectrograph. Timely warning enabled bearings to be replaced before failure.

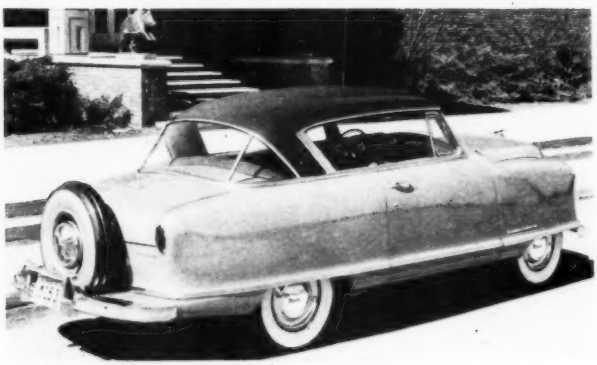


Jeep Hot Rod Charges Up Hills on Eight Wheels

When a hot-rod expert gets through with a jeep, it can climb grades that would make a burro puff.

Vic Hickey of South Gate, Calif., developed a high-compression head for the civilian jeep above. That increases the horsepower 17 percent. Then he worked out aluminum adapter spools (right above) for dual sets of wheels. That improves traction and pulling power. The eight-wheeled result is shown on a test run up one of Los Angeles' steep hills.

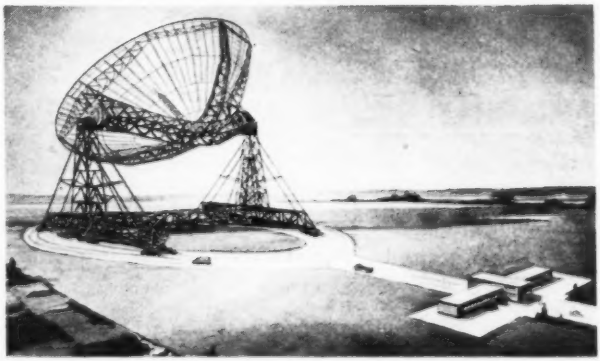
Low, Sleek Rambler Goes Continental with Outside Spare



You can now have the Nash Rambler hard-top convertible with a spare tire and wheel carrier mounted on the rear in continental style. Reclining seats that can be adjusted to four different positions, and Solex safety glass, tinted greenish-blue to filter out road glare and heat rays, are other optional features. Larger tires (6.40 by 15) are now standard equipment.

Huge Radio Telescope Will Hear Murmurs of Lightless Stars

This huge radio "telescope"—a paraboloid aerial 250 feet in diameter and weighing 1,270 tons—is planned in England. It will pick up signals sent out hundreds of years ago by stars dead of old age or too young to emit light. Uprights straddling a circular track will allow the aerial to be swung in any direction. It will take four years and $940,000 to build it.



Rods Make High-Line Repair

LINEMEN no longer take down miles of high-voltage wire to repair splices. One by one, 12 preformed aluminum-alloy rods are wrapped over bad joints. In minutes, the line is back in service and the electricity is shunted through the rods to keep heat from building up in the defective splice beneath. Worked out by the Southern California Edison Co., the new method is said to improve conductivity across old splices 400 percent and more.

Meter Seeks Out Hidden Nails

Too many blowouts made Heinz Freund of Berlin turn inventor. For locating nails or other metal snippets embedded in his tires, he devised an electrical instrument (above) that works like a mine detector. When it is held against the tread as the tire is revolved, the presence of any metal within its electrical field is indicated on a voltmeter near the handle. He plans to market the tire saver in Germany for about $3.50.

Trash Vacuumed Off Roadway

CALIFORNIA highways are being cleared of litter with the giant vacuum cleaner above. Seated on the curb side of the vehicle, a worker guides the hose with a handle bar attached to its snout, sweeping it from side to side and lifting it over obstacles. To speed the pickup, men walk ahead, raking debris to the roadside. The Good Roads Machinery Co., Minerva, Ohio, makes the vehicle.

Back-Yard Mechanics Build Racing Planes

Their midgets, swooping around a pylon at 200 m.p.h., put this year's air races practically in your lap.

By Douglas J. Ingells

IN A garage only a few blocks from where I live in Dayton, Ohio, a very secret project is in progress. You'd think my neighbors, Walt Buffington and Chester Bigos, were building a super A-bomb. They eye a stranger with deep suspicion and act like they feared a spy was lurking behind every bush ready to grab their idea and run.

But once you win their confidence, everything is okay. They trust you then with the information that they are building an airplane. It is a midget racer which they have

BUZZING MIDGET cuts close around pylon at Cleveland airport in $25,000 Goodyear Trophy race. This year the top event will be Continental Motors Trophy race at Detroit.

dubbed the B & B Special. Their aim: to startle the world—and pick up some cash—in the big air races to be held at Detroit on Labor Day.

All the midget-airplane people are secretive like that. They are members of a very special cult with a code all their own. They'll help each other at the drop of a hint; they'll exchange engines, sell parts, lend money if they have it, even pool labor, for the common cause. But they'd shoot their best friend if they thought he was out to "steal" their idea.

Just Ordinary Guys

My neighbors, Walt and Chester, are typical of this strange postwar breed. They are also a couple of average Joes who, at first glance, look like ordinary American mechanics, which they are. Walt works on the flight line at Wright-Patterson Air Force Base; Chester in the Aeroproducts Division of General Motors.

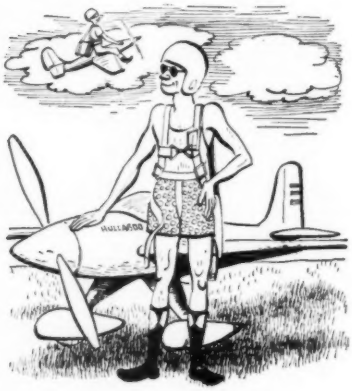
They're both married and they earn about $75 a week. Living expenses in this critical defense area just about eat that up, with nothing left over to support the B & B Special, a baby that is always in need of new shoes or something.

"We pick up extra jobs at the airports around here," Walt explains. "There's always somebody who needs a good mechanic. Every extra buck goes into the Special."

The B & B Special has been in progress for more than three years now. Originally, my neighbors planned it for the 1949 races. They almost made it but for the fact that the brakes went haywire just when Walt attempted a taxi test. The tiny plane roared into the air out of control, then smacked into the ground.

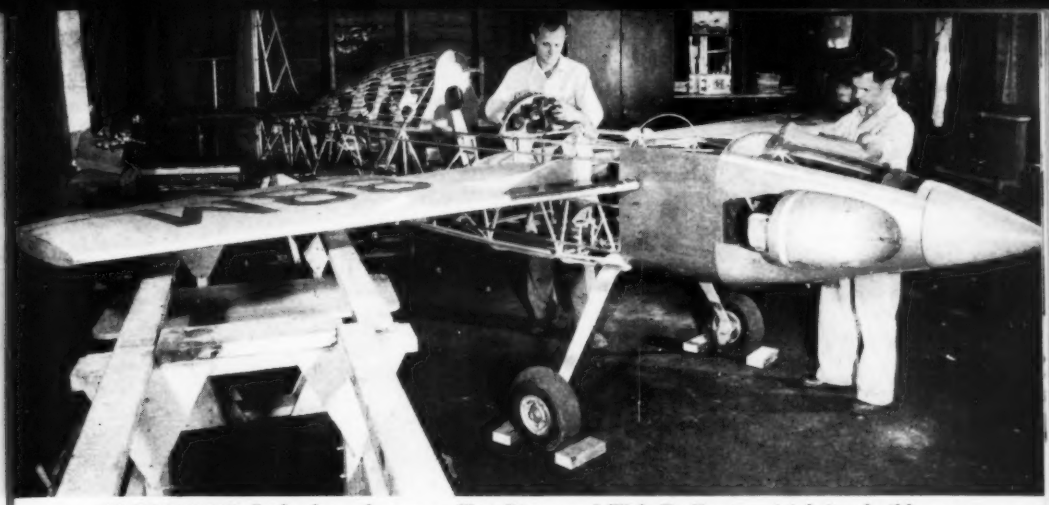
When Walt awoke 10 days later in a hospital, Chester was at his bedside to assure him there was nothing wrong with the basic design. The trouble was purely mechanical. All they had to do was raise some more money and build again.

So far the special has eaten up about $3,219 in cash money and about 1,200 hours of the spare time of two skilled mechanics. The labor of love averages 25 to 40 hours



a week for the two men, all on top of a regular eight-hour day in the shop, plus extra hours at the airports. It's a real heartbreaker and full of sacrifices, causing sleepless nights, domestic tensions—"You love that plane more than you do me!"

And, for what? By now Buffington and Bigos trust you enough to let you look. Theirs is a dream of a little airplane, trim and neat, all blue and yellow. It has a fuselage length of 17 feet, tubular construction with fabric covering. Its wings measure 15 feet from tip to tip. An 85-horsepower Continental motor drives a 60-inch propeller. The tiny cockpit looks too small for a grown man to get in.



SECRET PROJECT: In back-yard garage, Chet Bigos and Walt Buffington (right) rebuild racer.

"You don't climb into it," Walter has his little joke. "You pull it on like a pair of pants."

There are exceptions, of course, but most of the midget racing planes are dreamed up and built by back-yard mechanics in small towns, young men like Buffington and Bigos, or, for that matter, like the Wright brothers, who were doing the same thing a half-century ago.

Many Enthusiasts Build Midgets

There are perhaps three or four hundred of them scattered around the country. Some of the creations will never get off the ground; some will circle around the pylons of the 2½-mile closed course once or twice and be forgotten. A few will share the big money at the National Air Races, others will settle for second-string meets at Miami, Chattanooga and Reading. Others will hit the county fairs and airport shows.

Bill Falck, for one, boasts that he hasn't missed a midget race of any importance since the sport was revived five years ago. Back in the Thirties, in his early teens, Falck started hanging around airports in the New York area. He did odd jobs around the hangars, taking pay in flying time. Then he got a plane of his own and a base at Warwick, N. Y. In 1947 he picked up a secondhand racer, redesigned it to his own tastes, flew it to Cleveland and won a consolation prize. That was enough to make him an addict for life.

A roster of the midget racers would include an assorted company of enthusiasts. Jimmy Miller, for instance, owns a super-

FINISHED JOB: B & B Special, ready for National Air Races, has a wingspread of 15 feet.

market, but takes time out to build and fly his own racer. Prof. Robert Routenstrauch of Bucknell University is a designer of midget planes. Ralph Thompson Jr. pays for his plane out of wages as a garage mechanic. Thirty employees of Lockheed Aircraft have put $45,000 into three small ships, representing about the biggest single stake in this so-called "poor man's sport." And there's Neal Loving, the Negro lad from Detroit, who lost both legs in a glider crash. He flies it hot and fast in a snappy, revolutionary gullwing midget he designed.

Racers Are Serious-Minded

The midget racers don't take kindly to the nickname "aerial hot-rodders." They'll tell you that theirs is a serious purpose—to improve the quality of small planes. Dean of the racers is Steven Wittman, a former school teacher from Oshkosh, Wis. Now pushing 50, he wraps up his wisdom in a simple package thus:

"All the secrets of this business are in the bulletins of the National Advisory Committee for Aeronautics. All you have to do is read them. They are your Bible of aerodynamics for midget builders."

The history of modern midget racing traces straight back to the closed-course speed races which began in the early 1920s. These developed into the National Air Races, which were great fun until the planes got so big and fast they lost their appeal as a spectator sport. They were invaluable, however, for testing fuels, designs and assorted gadgets under severest conditions.

Abandoned during the war, the races were revived in 1946—with a difference. War-surplus fighters were used in what proved to be an unpopular form of racing. "The only thing these war planes prove is [illegible]h guts a pilot has to kick 'em wide [illegible]pen," was the comment of one veteran pilot. Another veteran, Bill Odom, crashed into a bungalow with a revamped P-51.

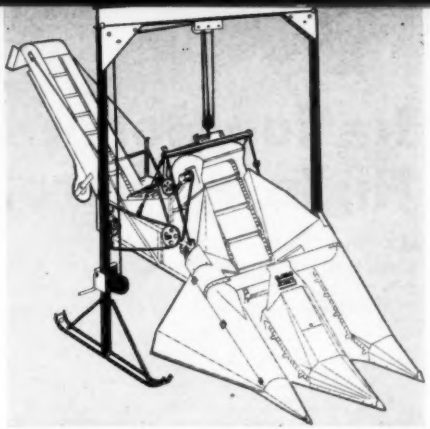
This was the final blow. Cleveland turned thumbs down on big-plane racing, welcomed the midget racers in their stead.

Benny Howard and Art Chester had seen the handwriting on the wall. Back in 1939 they had assembled a group of pilots and had drawn up plans for a small-plane speed classic to be run over a small, closed course at low altitude, in front of the stands so spectators could watch the whole show.

[*Continued on page 218*]

Wings clipped for highway travel, Al Foss's homemade midget tows easily behind family sedan.

TRACTOR UNIT provides motive power for multi-purpose farm machine, shown in use as a corn picker and husker in photo below. Easily interchangeable attachments adapt new machine for this purpose or for use as a combine.



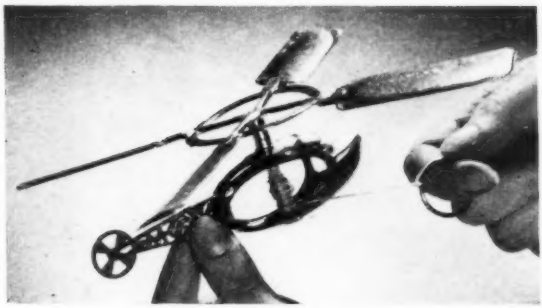
HUSKER, ready to be attached to tractor unit, is shown suspended from cable and sling that make a simple task of changing attachments. A three-wheeled dolly (not shown) serves for storing attachment that is not in use.

Quick-Change Farm Machine Harvests Wheat or Corn

CALLED the "harvester of tomorrow," a new self-propelled farm machine may be used either as a combine in wheat fields or as a two-row picker and husker in corn fields. Attachments for each purpose fit on a tractor unit having a four-cylinder 38-hp. engine, and are interchanged by removing only one bolt, two slip pins and two spring-release pins. A cable hoist and sling make light work of handling them. The nine-foot combine has a hydraulic lift that sets the cutting height anywhere between two and 24 inches. On the husker, snouts are adjustable to five floating positions. The Uni-Harvestor is made by Minneapolis-Moline Co., Minneapolis.

Toy 'Copter Looks Real

HERE'S a toy helicopter that really looks like a helicopter, especially as it buzzes high overhead. When a child winds it with a string like an old-fashioned top and pulls the cord, it takes off with rotor spinning. Called the Skyro-copter and made by Marxman Pipes, Inc., New York City, it is said to fly high as 300 feet.



Nation Honors Highway Hero

A storybook adventure helped make this unassuming trucker Driver of the Year.

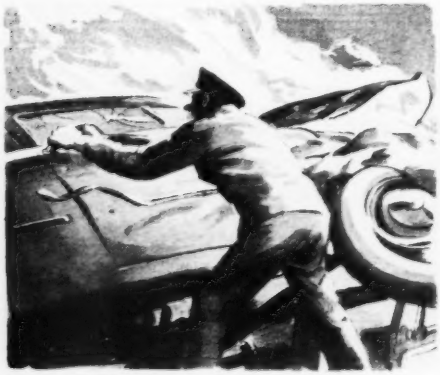
HUSKY, blue-eyed Allen C. Sagerhorn of Barnesville, Minn., is a good truck driver, and a modest one, too. In 11 years he hasn't had an accident. And after he risked his life in a daring rescue, he didn't even leave his name. That's how he won the American Trucking Association's 1952 title, visited the President, and appeared on radio and TV. Then he went back to work.

1 IT HAPPENED AT THREE A.M. January 18, 1951. Sagerhorn was pushing 45 on the Fargo-Minneapolis run when he saw fire by a bridge.

2 DESPITE ICY ROADS—the temperature was 30 below—he hit the air brakes and skidded his giant rig. A car was overturned, blazing.

3 COATLESS, Sagerhorn leaped out of the cab into the frigid night and ran to the flaming wreck, heedless of the danger to himself.

4 THE DOOR WAS JAMMED. Seconds meant life or death to the unconscious man trapped inside. Sagerhorn ran back for a jack handle.



5 BRAVING THE SCORCHING BLASTS, he managed to pry open the door just before gasoline-fed flames devoured the car.

6 THE MAN HE SNATCHED from the inferno was Rodney Lenzmeier, 21, who had fallen asleep at the wheel on his way to work at the stockyards in South St. Paul. Lenzmeier had crashed into the bridge abutment and been knocked out as his car had burst into flames.

7 LIGHTS WERE APPROACHING. Sheriff N. J. Neumann and Deputy C. M. Nelson had spotted the fire and sped to the scene.

8 THE OFFICERS put Lenzmeier in their car to rush him to the hospital. Thanks to Sagerhorn's quick work, he was not badly burned.

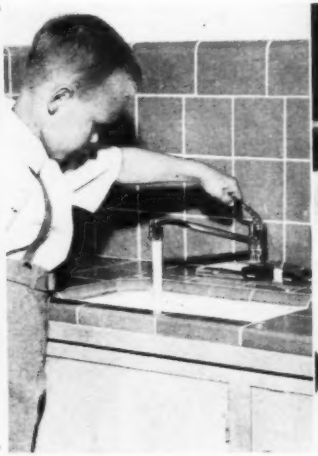
9 WITHOUT EVEN GIVING HIS NAME, Sagerhorn hopped back into his truck and drove off. It was a month before he was identified.

10 VOTED DRIVER OF THE YEAR, the 37-year-old hero was congratulated by President Truman at the White House on May 7, 1952.

Aids to Modern Living

1. Portable Hammock. The wooden frame of this hammock folds so that you can carry it along in the car or store it in a small space during the winter. When set up, the wide legs prevent tipping and turnbuckles at either end allow for a tight- or a slack-hanging hammock. The Lumite plastic hammock dries within a few minutes after rain.

4. Lined Basket. You can drop a greasy paper napkin, an apple core or even a smoldering cigarette into this leather wastebasket without worrying. In place of the usual cloth lining, it has a removable, fireproof liner made of steel.



5. Mixing Faucet. You can control both volume and temperature of water flow from this faucet with one hand. Lifting the lever turns it on. Twist to the left—the water is hotter; twist to the right—it's colder; press down and it shuts off.

6. Shell-less Egg Cooker. No need to juggle hot eggs to remove the shells when they are prepared in these heat-proof glass cups. Dropped into the cups without shells, they're lowered into hot water for soft cooking, then brought right to the table.

2. Water Pockets. One pocket of this plastic apron holds suds, another rinse water, the third cleaning cloths for window washing. With tools stowed in the pockets instead, it's handy for gardening.

3. Kneeling Shower Head. This combined shower head and tub filler adjusts fo various angles. Raise Adjusto high for showering an adult, lower it a bit to spray youngsters or to shampoo your hair.

7. Suds Dispenser. Fill the Squeeze 'N Wash with soapy water, press the sides of the plastic bottle and suds are forced through a nylon-bristled brush. A quick swish and windows or dishes are spanking clean.

8. Interchangeable Lenses. Remove the green sunglass lenses in these Eye Savers, insert the yellow ones and you have night glasses that are said to make television watching easier on the eyes.

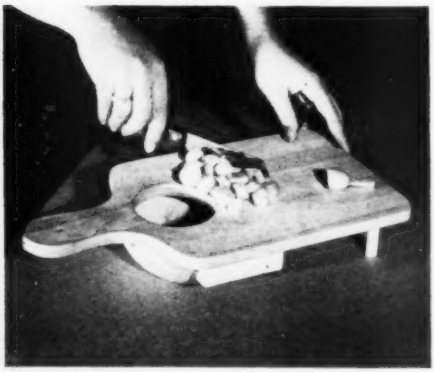
Further information on these products can be obtained from: 1. Houtz & Barwick, Box 225, Elizabeth City, N. C.; 2. Ett-Barr Co., Box 401, Pasadena 18, Calif.; 3. Milwaukee Flush Valve Co., 301 E. Reservoir Ave., Milwaukee 12; 4. American Binder Co., 230 Taaffe Place, Brooklyn; 5. Moen Valve Co., 6518 Ravenna Ave., Seattle 5; 6. McKee Glass Co., Jeannette, Pa.; 7. Anro Products Co., 4610 N. Ravenswood Ave., Chicago 40; 8. Eye Savers, Inc., 115 N. George St., York, Pa.

Please turn the page for more aids to modern living.

MORE Aids to Modern Living

9. Knife Hone. It doesn't take an expert to put a slick edge on a knife with Sharp Stik. The wooden holder in which it is set keeps the blade at just the right angle for sharpening against the steel.

10. Reading Rack. Here's a lap tray that makes light work of reading heavy books or magazines. For use when seated in a chair or in bed, it adjusts to a level position for eating or writing, folds flat for storage.



11. Chopping-Board Bowl. A six-inch wooden bowl slides in and out beneath the hole in this board. Peg legs at the opposite end make it stand level. Chop vegetables on the board, scoop them into the bowl through the hole and nothing is lost overboard.

12. Ladder Caddy. It's always when you're up the ladder that you find the hammer is on the floor. Arrange your tools on a holder like this and they'll stay within arm's reach. The unit slides on and off a base plate fixed to the ladder.

Further information on these products can be obtained from: 9. Robeson Cutlery Co., Perry, N. Y.; 10. J. J. Felice, Box 103, Ridley Park, Pa.; 11. The Krebs, 45 Broad St., Westerly, R. I.; 12. Tetfoam Corp., Ambassador Bldg., St. Louis 1.

Plastic Cars? Not Now!

LIGHTNESS of plastic body is dramatically shown here by workman carrying Skorpion body, made to fit Crosley chassis.

Auto bodies of reinforced plastics have lots of good points but they are not ready to move from the custom class into mass production.

By Carl Konzelman

Henry Ford once took an ax
And gave the body forty whacks.
When he saw what he had done,
He gave the fenders forty-one.

NEEDLESS to say, the body that Henry took an ax to belonged to a Ford. It was 1941 and the pioneer of mass-produced autos was demonstrating his newest baby—a plastic auto body. When it absorbed punishment without a whimper, auto owners everywhere pipe-dreamed an early flow of indestructible plastic cars from Detroit's assembly lines.

Eleven years and 25 million passenger cars later, the auto industry trots out its best still clothed in steel. Plastic cars—custom jobs, ghost cars for display—have nudged the headlines briefly, then vanished. Now such handsome sport bodies as the Glasspar, designed by William Tritt (PSM, Mar. '52, p. 148), and Skorpion (PSM, May '52, p. 172) raise the question again: What about plastic cars?

The answer isn't simple. Plastics have come a good way since Henry Ford's time. Originally, plastics were used only for small objects because high pressure and heat were required to form them. Today new resins like the polyesters have changed the picture. They set with comparatively low pressure and heat—some without any pressure at all and at room temperatures. And now glass fibers can be used to strengthen these plastics much as steel rods strengthen concrete.

Glass Must Be Pretailored

The glass comes as a woven fabric—which is expensive—or a mat of fibers. Either type must be pretailored. The glass can be cut into pieces that fit the mold, or "preformed"—chopped up and sucked onto a form roughly the shape of the finished product.

Next step is to combine the glass fibers with the plastic resin. The simplest method,

used for the Glasspar body, is the lay-up. Tailored glass-fiber pieces are put on a female mold that has been slicked with a fast-curing coat of plastic to assure a smooth outer surface. Plastic is squeegeed into the glass cloth and allowed to harden.

The lay-up method is especially suited for large objects and comparatively small output. Frequently, however, some form of low-pressure molding is used to make the material more compact. The fiber and resin may be pushed against a female mold by an inflated rubber bag, or sucked against a male mold by vacuum. For high output, matched male and female molds, heated to cure at the same time, are widely used.

Stronger Than Steel

Reinforced plastic has a lot to offer. Weight for weight it can be made stronger than steel. Brilliant colors can be added in the resin. The plastic can be made as resilient or resistant as you desire. It makes much lighter auto bodies, which in turn make possible lighter engines. Sound and heat insulation—and therefore comfort—are improved. Construction is simplified.

Ford's pioneer plastic car had a welded structure of steel tubes, serving both as chassis and body frame, that was covered with plastic panels. William B. Stout, noted aircraft and auto designer, later developed a Fiberglas car with no frame at all. Even its bumpers were plastic. It was 1,000 pounds lighter than a conventional body, but Stout added ruefully that it was too expensive to be produced at that time.

Chrysler, too, has spent much time and money on the plastic-body dream. Fenders, doors, rear-deck lids, hoods, instrument panels and removable convertible tops were fabricated of polyester plastic and glass fiber as long ago as 1942-43.

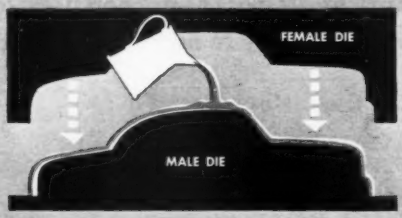
With all this research behind them, the auto men recognize the advantages of the plastic body. But, they say, it cannot now be made for a mass market. Here are the reasons they give.

Basic is the cost of the material itself. Steel sells for less than a nickel a pound. The price of reinforced plastics varies from around 50 cents a pound when mat is used to as much as $1.75 a pound with a glass cloth. This is partially offset by the smaller weight of plastic required. For small runs,

[*Continued on page 240*]

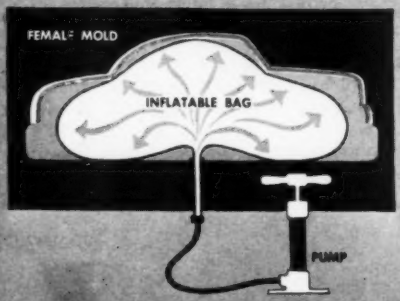
How Plastic Bodies Are Formed

1 LAY-UP, simplest method, uses either male or female mold, needs no press. Glass-fiber pieces are laid on mold and plastic is brushed in until desired thickness is reached.

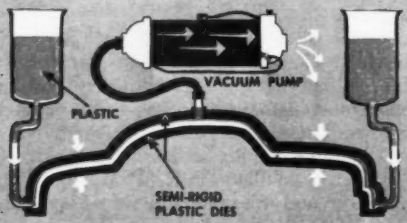


2 HEATED MALE AND FEMALE DIES are the most expensive to use but quickest, and therefore are best suited for mass production. Mold pressures are 100 to 250 pounds.

3 BAG MOLDING is used for large, irregular shapes. An inflated bag pushes glass and plastic against a female mold at pressures between five and 30 pounds per square inch.



4 IN VACUUM MOLDING, semi-rigid plastic dies are pulled together by exhaustion of air in space between. Same vacuum sucks in plastic through the fibers around rim.



HENRY FORD SWATTED his plastic car with an ax in 1941 demonstration of ability of experimental body to withstand impact. It had plastic panels mounted on a tubular frame.

ASSEMBLY-LINE METHODS of producing steel bodies are shown at this Fisher Body stamping plant at Pittsburgh. Note stack of rear fenders beyond resistance-welding machine.

GLASSPAR BODY is made by lay-up plastics method. Men are placing glass cloth over glass mat in female mold and coating with Vibrin resin. Glass must be tailored to fit.

P.S.

Last minute news & notes...

A NIGHT-FLYING BOMBER that could make "a flight around the world under cover of darkness--beating the clock--and on a pound of fuel with plenty to spare" may result from current development of atomic-powered planes, says the Aircraft Industries Association . . . LAUNCHING an F-84 Jet fighter from a huge B-36 in flight, a recent Air Force feat, foreshadows bombers carrying their own escort for defense against enemy aircraft.

SMELTING IS ELIMINATED by a revolutionary chemical way to get copper, nickel and cobalt metals directly from ore. In an autoclave, or "pressure cooker," hydrogen gas and other reducing agents precipitate the metal from acid or ammonia solutions. Product: a metal powder more than 99.9-percent pure. First big plant to apply the idea, developed by American Cyanamid Co., will go into operation this summer.

A NEW KIND of stop-go signal automatically flags down a motorist going too fast for his own safety at a curve near Natural Bridge, Va. His car wheels pass over a detector in the pavement that sets the signal according to his speed. At 25 miles an hour or less, he gets a green light. If he is going faster, a red light makes him stop and wait for it to change. Twelve deaths at the curve inspired the safety signal.

SAWDUST fuels a gas turbine developed at the Oregon Forest Products Laboratory. An experimental model adapted from an aircraft turbosupercharger has been successfully operated there.

NEWLY PLASTERED WALLS should be left undecorated for at least a week--with some brands of plaster, for a whole year. MIT researchers say this time is needed for slaked lime in the plaster to combine with carbon dioxide in the air to form calcium carbonate. The slaked lime may bleach paint or wallpaper; the carbonate is harmless.

THE TWELFTH U. S. CAR to adopt overdrive is the Plymouth. This fourth-speed device will be optional on its '52 models. Its inventor, William B. Barnes, estimates that at least 4,000,000 overdrives are on the road today . . . HORSEPOWER KITS for boosting the output of 1949-51 Cadillacs are now available from the factory. They consist of parts made for the 190-horsepower 1952 engine . . . PINK TIRES? Maybe. There's a new synthetic called Hypalon that is suitable for auto tires and can be compounded with colored "fillers" instead of carbon black.

A NEW HEAT GAUGE will warn a truck driver if differential oil gets too hot. Made by Stewart-Warner, it's a heat-sensitive element screwed into the rear-end housing and wired to a dial on the dash.

CURRENT COMMENT

"EXCEPT FOR ACTS of imagination or genius, there is scarcely any human mental occupation which, in principle, an information machine could not do better or faster."--Prof. Louis N. Ridenour, University of Illinois . . . "INVENTION IS ONE of the greatest arts. In its broadest sense it embraces all of the arts. It is the bringing together of known elements into new relationships." --Thomas J. Watson, chairman, International Business Machines.

WEEDLESS GRASS, whose strong turf rarely if ever needs watering, will be introduced soon. It should prove ideal for home lawns, as well as for golf links, for which it is under cultivation by the U.S. Golf Association. The seed is a blend of Meyer Zoysia, an Oriental variety said to be so tough that it pushes crab grass out of the way, and of heat-resisting Merion blue from an Ardmore, Pa., golf club.

The Editors

MECHANI
and
HANDICRA
REG. U. S. PAT. OFF.

These colorful plastic panels go on with hand tools. Here are seven pages of ways to use them.

New Porch Roofing Lets in Light

1 LOW STONE WALL is base of my covered terrace. Two-by-four sill was bolted to top of wall. Porch framing could begin at ground level with sill on slab. Studs are 3′ apart.

2 ALL FRAMING is two-by-fours for economy. Rafters are nailed to face board and both are nailed to studs. Two rows of spacers 4′ apart are toenailed between rafters.

By Darrell Huff

"I WANT a screened porch at the back of the house," my wife said, "but I do *not* want the rooms there made dark."

That put the job up to me. Because how are you going to roof a terrace without darkening the windows that look out on it?

I found an answer, though. It was the translucent-plastic building material that you saw in the cantilevered roof of the porch shown on the preceding page. This material comes in both soft and brilliant colors. Roofing a porch is just one of its uses.

A sheet set in a frame makes a door that is a slick answer to dark doorways. It can be used for skylights, translucent windows, sun shelters, interior partitions, louvers, awnings, bathtub and shower enclosures, fences, diffusers for light fixtures. Even the manufacturers are being surprised by uses to which buyers are putting it.

I used a dark shade, leaf green, to roof my terrace. It not only looks cool but actually is, since it cuts out the greater part of the heat rays while letting through a good deal of light.

More Light Instead of Less

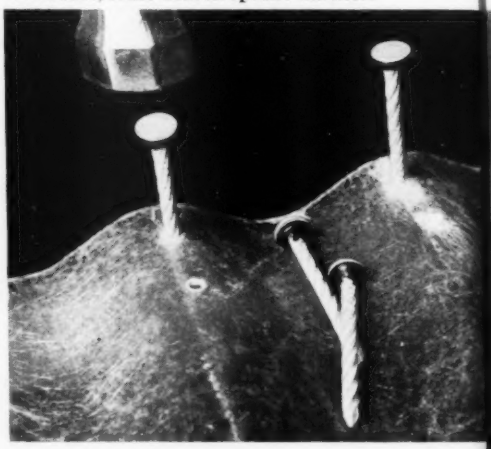
One odd thing has happened, something I didn't expect and that even the manufacturer hadn't promised. Instead of making my house darker inside, the porch has made it much lighter. It appears that the whole terrace roof is now taking up light as a sponge takes up water and shooting it in through my windows.

Made by impregnating a glass-fiber mat with polyester resins, this material has a number of interesting characteristics. It is quite amazingly strong and light (half a pound to the square foot), impervious to all kinds of weather and resistant to fire.

With retail prices around $1.35 a square foot, it is not cheap. In use, however, it is more economical than this sounds, since it needs only light framing, goes up fast, can be cut and placed with ordinary tools, and is easily handled by one man.

The neatest and quickest way to cut it is with a cutoff wheel in a power saw. Any fine-tooth handsaw will cut it, but—as I

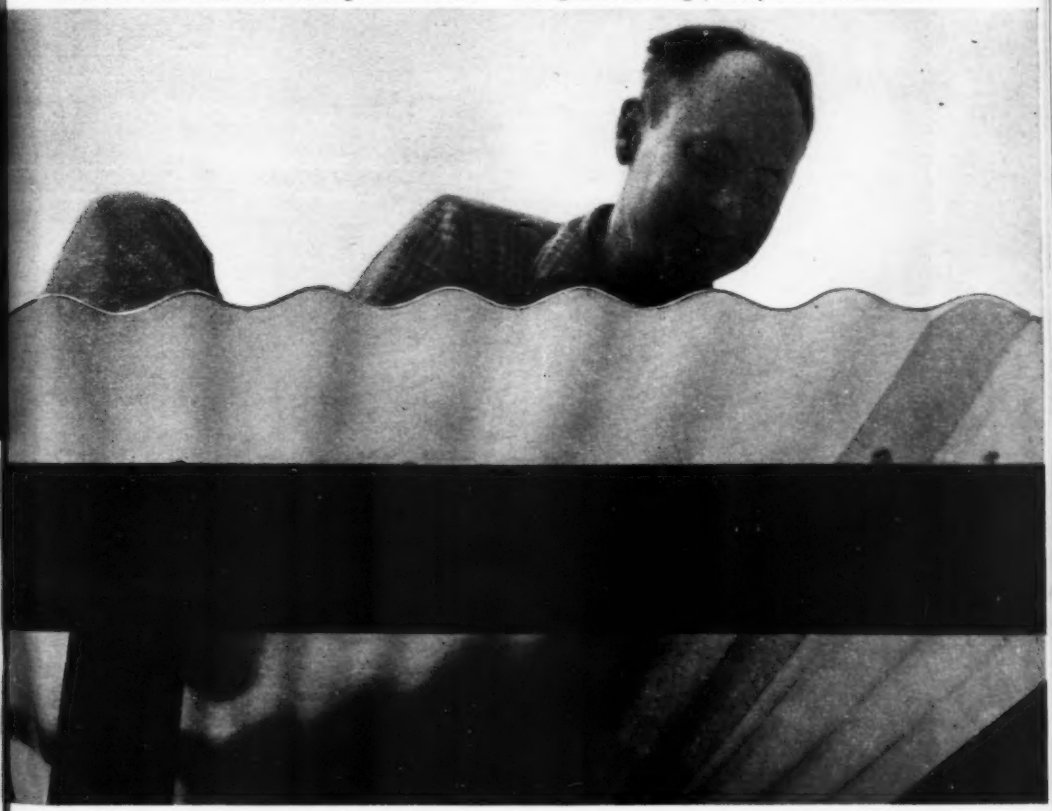
5 PREDRILLED HOLES (left below) are best: nails driven without drilling produce local crazing marks (right). Aluminum screw-nails won't rust, come with neoprene washers.



3 HANDSAW will cut the plastic panels. Use an old saw because plastic dulls the teeth quickly. Fairly fine-tooth blade is best. Use grease pencil or crayon to mark plastic.

4 ABRASIVE CUTOFF WHEEL—same kind used to cut metal—does nicely with plastic panels. Use it on table saw or portable saw. Carbon-steel blade cuts well but dulls fast.

6 NAILING can be done while you kneel on top of the plastic panels, which are strong enough to hold several persons at once. Photo below also shows how corrugations of two sheets are lapped. Increased overlap and mastic would make completely waterproof joint. I used one nail through every second corrugation on edge, every third elsewhere.



7 SCALLOPED EDGE of ½″ wood closes openings between top of face board and corrugations. Since this porch is to be screened in later, it was important to plug all gaps.

found out—the teeth will dull rapidly. It has also been cut successfully with a portable power saw and ordinary blade. You can make small trimming cuts with big shears or tin snips or a small metal-cutting handsaw. Cutting is not much of a problem with most home installations, where you can simply buy sheets the right size and put them up as they come.

Fastening may be done with bolts or screws, but nails usually are used. Aluminum screw-nails with neoprene washers, sold for corrugated aluminum roofing, worked out fine for me.

8 FINISHED PORCH is cool but bright as sunlight is diffused by the plastic panels, and the eye-resting color makes the area seem even cooler than it is. The rooms with windows opening onto the porch are brighter than they were before because the plastic roof catches the sunlight and acts like a big lighting fixture to spread the illumination.

Holes for bolts or screws may be made with any hand or power drill. Drilling holes for nails makes for greater neatness but isn't necessary on most jobs.

Overlapping Makes Tight Joints

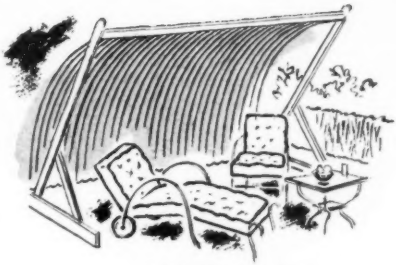
You can get the plastic sheets with corrugations to match various aluminum and asbestos-cement roofing materials. They come in several widths and in 8′, 10′, and 12′ lengths. There are curved sheets and flat sheets.

In joining sheets you may lap them one or 1½ corrugations. Mastic is available for

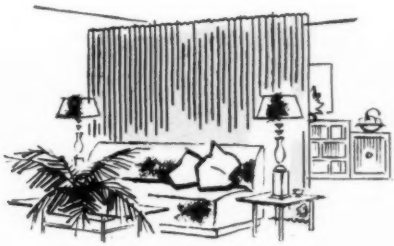
9 DOOR is plastic framed with two-by-sixes at sides and bottom, two-by-four at top. Inside of stiles was grooved ⅛″ by 1″ at 30° angle, the angle where corrugation was cut.

10 HINGED AND HUNG, finished door lets in light but blocks view into porch from road. Molding on inside edges of top and bottom rails was jigsawed to fit corrugations.

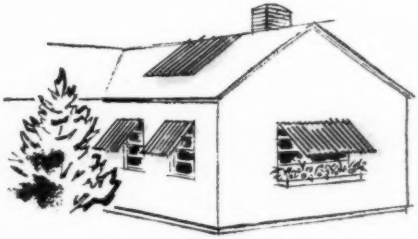
More uses for plastic panels are shown here and on the next page



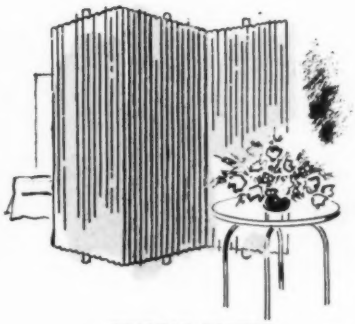
GARDEN SHELTER



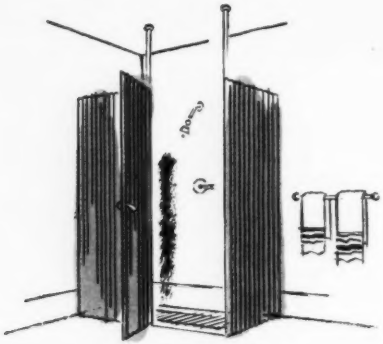
INTERIOR PARTITION



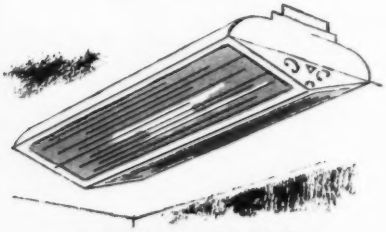
AWNINGS AND SKYLIGHTS



FOLDING SCREEN

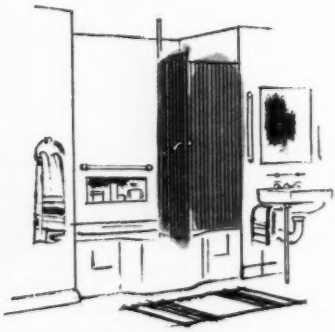


STALL SHOWER



FLUORESCENT DIFFUSER

CARPORT



ENCLOSED BATHTUB

cementing sheets together where, as in a skylight, tightness is essential. Also use the mastic on a flat roof, and remember to allow a slight pitch for good run-off of water. It's best to run the corrugations in the direction of the slope, and overlap the higher strips over the lower ones so rain and snow can't collect.

End laps should be 6″ to 8″, depending upon pitch of roof. Since these materials are made in sheets up to 12′ long, end laps are often not necessary.

Simple Frame Supports Roof

Various accessories—corrugated moldings and closures—can be obtained for fancy jobs, but they are not required for most home projects.

To frame up a roof for Alsynite[1] or Corrulux[2]—the two brands of plastic sheet that are popular in my neighborhood—you can use the pattern shown in the photos. Or follow these standard specifications for a roof that will do nicely for a great many purposes:

- Make rafters of two-by-sixes on 22″ centers.
- Put two-by-four purlins (crosspieces) between them, flush with the tops of the rafters and not more than 4′ apart.
- If you want to paint or stain the lumber, do it before you put on the plastic.
- Use 26″-wide sheets with 2⅝″ corrugations (their width from hump to hump). This width will make each lap come at a rafter for strength.
- Nail with aluminum nails having neoprene washers. Nail on every second or third corrugation on the purlins and at 18″ intervals along the rafters.

Different Colors Create Many Effects

That's all there is to it—except for choosing your color. If you want to let through most of the heat and light of the sun and get a cheery, sunshiny effect, use a yellow shade.

Green shades will give you the coolest effect, both psychologically and actually, and still let more than half the light come through.

For equal coolness, use aquamarine if you want to reduce the light to about one-third. This is the most popular color for porches exposed to too much sun.

Rose will cut down on light more than it

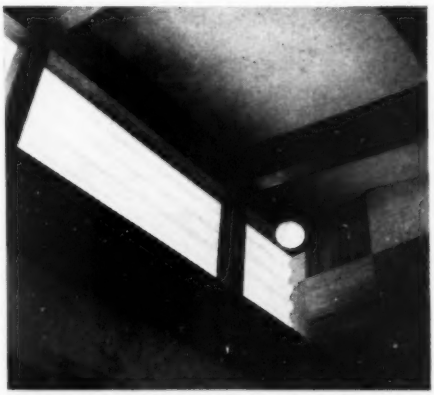
1. Alsynite Co. of America, 4670 DeSoto St., San Diego 9, Calif.
2. Corrulux Corp., Box 20026, Houston, Tex.

TRANSLUCENT-PLASTIC ROOF over entryway can be pushed up for ventilation in hot weather. In cool weather, frame holding the plastic panels fits down tightly in rubber gaskets.

will on heat. Use it for the flattering light it gives and for places where the sun's heat is often welcome.

All this applies mostly to outdoor uses, of course. When plastic panels go to work as room partitions, shower enclosures and light-fixture diffusers, color becomes a matter of appearance only. You will be guided largely by what colors are already being used in the room in question.

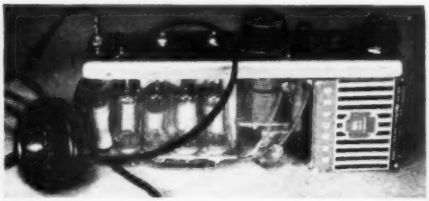
One caution, though: be prudent about using blue or green on light fixtures, especially in living and dining rooms. Both food and complexions can look a bit weird under light of these colors. Rose, on the other hand, is both cheering and flattering to any complexion. At least one great party-giver has attributed much of her success to rose-colored lighting: it made the women so much more attractive. END



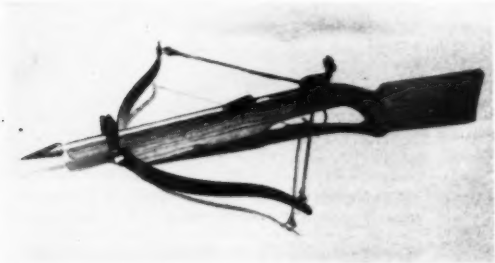
NARROW OPENING, high in wall, is fitted with plastic panel to light what otherwise would be the dark side of a room. Corrugations in this application run parallel with ceiling.

Craftsmen in Uniform

Tiny Turbojet. This baby jet engine, similar to the Allison J-35 series in design, has a nine-stage axial-flow compressor and five combustion chambers with interliners. The compressor is made of aluminum; the turbine wheel, vitalium; and the combustion chamber, stainless steel. Everything but the main bearings was scrap, according to Capt. Leslie F. Walters of Hamilton Air Force Base, Calif. He designed the jet primarily as a training aid, but he has revved it up to 25,000 r.p.m. with compressed air. Now he's working on a fuel and lube pump that will fit in the nose-section housing.

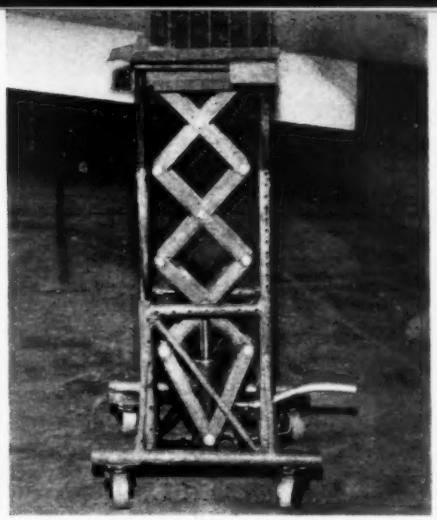


Motorcycle Radio. This four-tube superhet, super-compact to ride a motorcycle, is built to fit in a welded waterproof case B current is supplied by battery; filament current by one cell of the motorcycle battery. The maker, Capt. Philip H. Poser Jr., Wright-Patterson Air Force Base, Ohio, uses a crystal headset while riding, but can switch to a speaker.



William Tell's M1. This crossbow gets its punch from modern technology—the 125-lb. bow is a 31″ automobile spring leaf. It has adjustable sights and a special trigger, reports the maker, First Class Machinery Repairman William C. Meyers of the USS *Sphinx*. The 35″ stock is white ash, oak-finished; the bow string is 32 strands of waxed flax. Meyers makes his arrows from birch dowels.

Beep-Beep, the Baby Jeep. Lined up beside a regular jeep (above) this Beep makes the jeep look like a prime mover. Measuring 6′ long and 3′ wide, the Beep carries two passengers, has a rear-mounted 2¾-hp. Wisconsin air-cooled engine (below). A scooter chain with an automatic clutch drives one rear wheel. The steering-post shift lever controls two forward speeds and reverse. Both rear-wheel brakes are from a scooter. So are the four coils that make up the front springs; the rear wheels ride on an old car spring cut in half, with one end bolted and the other free. Shocks are from an Austin. The front end is a ¾″ pipe with a jeep universal joint partly welded to each end. The engine is started by cranking. Private First Class Henry C. Futrell, Fort Bragg, N. C., built the Beep in two months' spare time, spent $100 on it. He gets about 78 miles to the gallon.



Battery Elevator. A lazy tongs extended by a hydraulic jack does the work in this ingenious device for shoving a battery up into place on the underside of an airplane. Master Sergeant Elwin W. Bishop, Air Force ROTC, University of New Hampshire, points out that lifting a 75-lb. battery over your head is no cinch: it's easy to drop it or slop the acid. With his lifter, you just turn the crank and up she goes.

Craftwork Pays Off for Men in Uniform

Popular Science Monthly will pay $18.75 for every craftwork project by men or women in the armed forces accepted for this department. Send photographs and captions only to Craftsmen-in-Uniform Editor, Popular Science Monthly, 353 Fourth Ave., New York 10, N. Y. Although effort will be made to return material accompanied by postage, the editors can assume no responsibility for this.

In addition, the makers of the King Midget automobile, shown above, will send one, to any address in the continental U. S., to the contributor of the most interesting item received before August 1, 1952.

Detroit Designs a Super Hot Rod

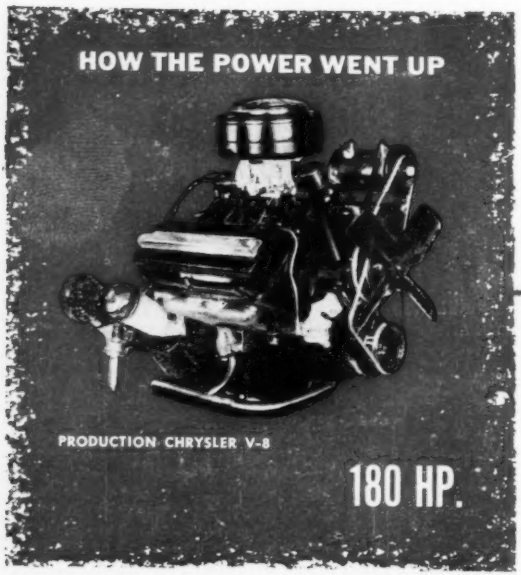
Chrysler engineers took a hemispherical-head V-8 and souped its 180 horsepower to a whopping 353. Here is the step-by-step story of how they did it.

By R. P. Stevenson

A TEAM of hard-working automobile engineers who are supposed to concern themselves with strictly stock passenger cars have out-hopped the hot-rodders by souping up a standard Detroit engine to twice its rated horsepower.

The engine is Chrysler's two-year-old, hemispherical-head V-8. The men who skyrocketed its power far above the basic 180 hp. are the same men who are planning the Chryslers you'll find in the showrooms next year—and the years to come.

What they did to the engine comes close, meantime, to inciting any well heeled hot-



rodder to do likewise. For, the results, ranging up to 353 hp., were achieved by the classic hop-up gambits:

- High compression.
- Multiple carburetors and special intake manifolds.
- High-speed camshafts.
- Larger valves and ports.
- An open, low-pressure exhaust system.

What the Chrysler engineers wanted to know was the full potential of their engine.

Tackling high compression first, they pulled one of their hemispherical-head V-8s off the production line and tested it at ratios as high as 12.6 to 1.

High Compression Saves Gas

Hot-rodders increase compression by shaving the head or installing a special one. For the present, the Chrysler experimenters left the hemispherical heads strictly standard and changed only the pistons. By raising the normally flat top of each piston, they reduced the space left for the fuel-air mixture at the top of the stroke. The production engine was not changed in any other respect.

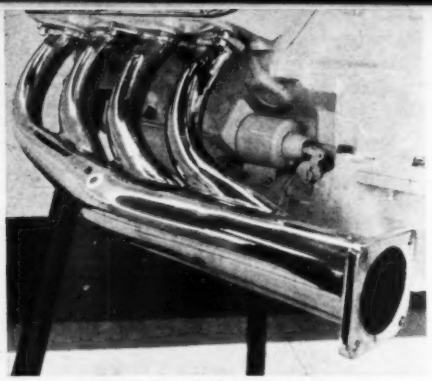
At a 12.6-to-1 ratio and 4,000 r.p.m., engine output jumped 35 hp. above the 180 at which the engine is rated with the standard 7.5-to-1 compression.

At the higher ratio, the engine also used its fuel much more efficiently. Consumption dropped so low, in fact, that James C. Zeder, Chrysler's engineering and research boss, told the Society of Automotive Engineers that the engine "makes any Diesel with which we are acquainted seem a veritable glutton for fuel."

HIGH COMPRESSION was obtained by raising normally flat top of each piston. As sketch shows, this reduces volume in hemispherical heads—and increases compression ratio. Top piston gives 7.5-to-1 ratio in standard engine; lower one raised it to 12.6 to 1.

Satisfied by these results that the engine would respond nicely to higher-octane fuel if it becomes available, the engineers next decided to see how they could improve performance on ordinary fuels.

This time they chose the path of volumetric efficiency—making the en-



FREE-FLOW EXHAUST MANIFOLD with easy, generous bends reduced back pressure and increased power. Manifold shown was exhibited with Chrysler's K-310 dream car.

gine turn out more power by enabling it to breathe better.

Starting anew with another standard engine, they first set out to see the gain they could get with a less restricted exhaust system. They also blocked off heat from the intake manifold—a trick back-yard soupers have long followed for improving VE.

With this equipment, the engine turned out 193 hp. at 4,000 r.p.m., 13 hp. more than production engines, and the torque peaked about 18 lb.-ft. higher.

Although the new exhaust header was designed without reference to its suitability for use in a car, the same principle later was put into the K-310, the dream car that Chrysler exhibited in major cities last fall (PSM, Feb. '52, p. 99). Twin pipes carry the exhaust to the rear.

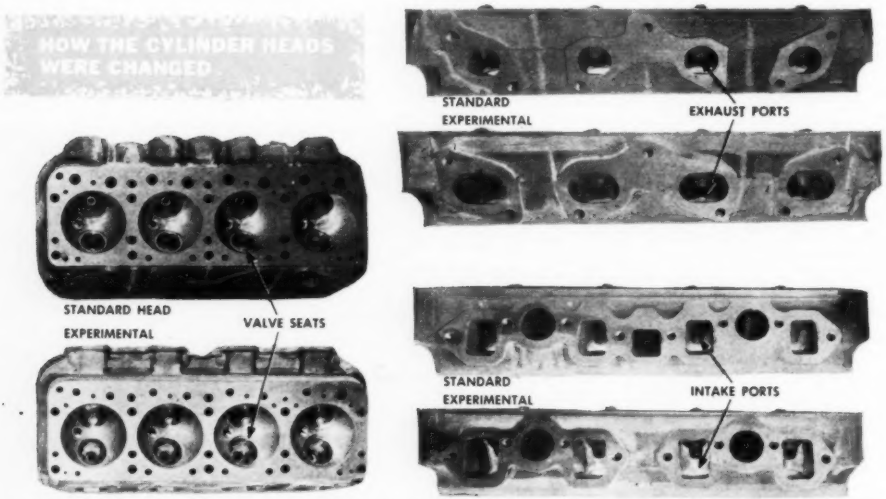
Still keeping the special exhaust, the Chrysler engineers now added nonproduction hemispherical cylinder heads and an intake manifold designed for high torque. In the special heads, the diameter of the intake valves had been increased by ⅛" and the exhaust valves by ¼", with the ports enlarged to match. These special heads were retained throughout all succeeding tests.

A Carburetor for Every Cylinder

The intake manifold adopted for this part of the experimental work used four single carburetors, each one arranged to feed two cylinders—but at intervals of 360°. This means that a cylinder gets the carburetor's full charge on each intake stroke.

After the special heads and intake manifold had been added, the peak speed jumped nearly 1,000 r.p.m., and power shot up about 42 hp., raising the total to 235 hp. The torque curve rose more sharply and peaked some 30 lb.-ft. higher than it had before.

These results gave Chrysler something to think about, since they were accomplished by comparatively simple mechanical changes that could easily be carried to the production line. They put out 20 hp. more than had been gained from raising the compres-



LARGER VALVES AND PORTS were used in the experimental engine to improve volumetric efficiency. Diameter of the intake valves was increased by ⅛", the exhaust valves by ¼".

sion ratio to 12.6 to 1. And the engine remained happy on easily available premium fuel.

Not yet content, the Chrysler engineers next turned to valve timing, feeling that some increase in valve opening would promote their search for power despite possible disturbance of the smooth idle. To do this, they pulled out the standard camshaft, which gives a 252° intake duration and a 244° exhaust with a 30° overlap.

Three Camshafts—All Hot

For test purposes they developed three special camshafts, resorting to an electronic computer to carry out the intricate mathematics required. Physical characteristics of the new cam lobes remain Chrysler's secret, but the three new shafts keep the valves open as follows:

A 260° intake, 260° exhaust and 40° overlap.

A 270° intake, 260° exhaust, 50° overlap.

A 280° intake, 270° exhaust, 60° overlap.

In practically all cases during the tests, the special camshafts were installed so the overlap was symmetrical—a 40° overlap, for instance, ran from 20° before top dead center to 20° after it. Each of the special cams increased the valve lift.

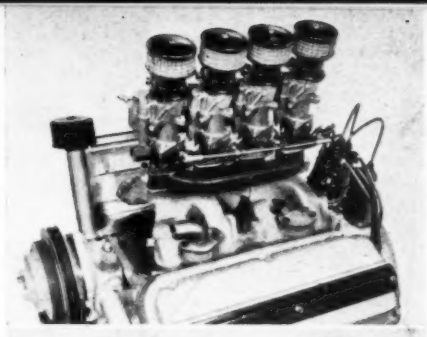
New Manifold Boosts Power More

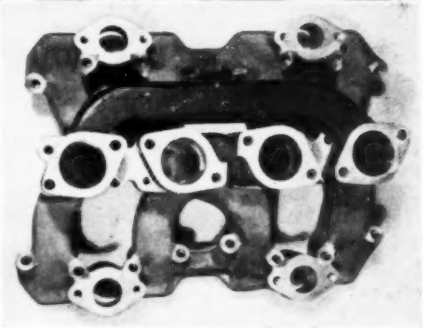
One after another, the three special cams were run through tests with the same engine components previously used. In general, as the timing intervals were lengthened, the power went up. However, the longest-duration camshaft, the 280°-270°-60°, did not add appreciably to the power and was slightly lower in torque. All in all, the middle shaft, the 270°-260°-50°, gave best results. Peak speed was increased by 500 r.p.m., torque by 12 lb.-ft., and horsepower by 40, raising the total output to about 275 hp., 95 above the production engine's 180. The idle performance of all these camshafts proved reasonably acceptable.

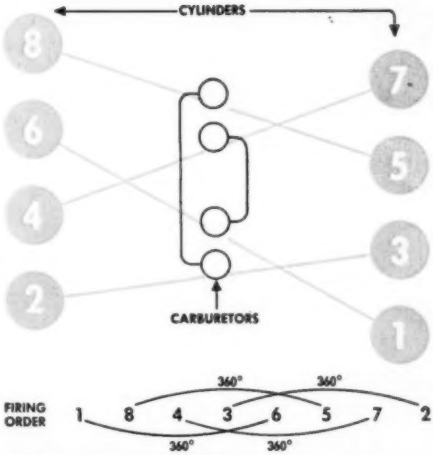
On the hunt for still more power, the experimenters then substituted an intake manifold of the double-runner type and conducted duplicate tests with all three special camshafts. Each manifold was fed by two single carburetors between pairs of ports. A single crossover in the center provided balance between the two manifolds.

Again the engine responded. Both power and torque increased progressively with increase in valve timing. The 280°-270°-60° camshaft sent output soaring to 309 hp. at 5,200 r.p.m. (This amounts to .933 hp. per cubic inch of engine volume.) The torque was somewhat lower than with the previous manifold, but held up much better at high speed.

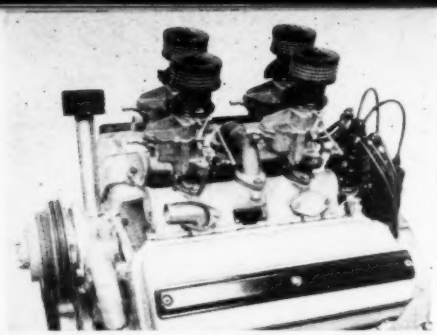
At this point, the experimenters came up

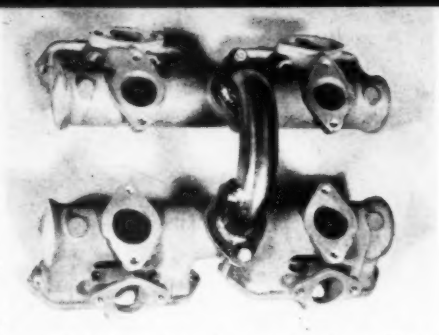






NEW INTAKE MANIFOLD was designed for one phase of experimental work. In this high-torque manifold, four single carburetors were placed in line. Sketch shows how each one feeds two cylinders—but at intervals of 360°. This means a cylinder gets carburetor's full charge on each intake stroke.





PAIR OF RUNNER MANIFOLDS was used for high-power experiments. In this case, each manifold is fed by two carburetors. These manifolds were used on display engine below.

for air and took the wraps off the engine. You may already have seen it. It was the flashy power plant that the Chrysler Corp. exhibited along with the K-310 car last fall.

But the engineers were not through yet. There still were a couple of power-boosting steps they wanted to try.

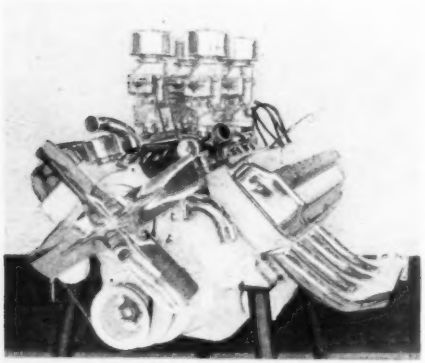
First, they increased compression to 12.6 to 1 as they had done before. Along with the better breathing components, this now turned out a whopping 353 hp. at 5,200 r.p.m.—1.07 hp. per cubic inch.

For this run, the quality of the fuel was raised to the best that could be made—the equivalent of iso-octane plus one cubic centimeter of tetraethyl lead per gallon.

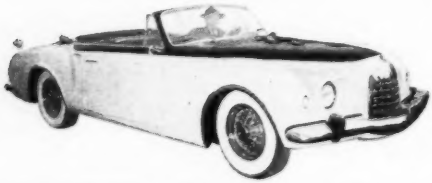
And now Mr. Zeder speaks:

"It is significant that, with the latter fuel, the basic FirePower cylinder gives performance comparable with the Indianapolis engines, which have been developed for power without regard to any other purpose.

"Since these competition engines frequently use methanol, it was decided to run a final test of the potentialities of the FirePower engine using the same fuel. These tests are in progress. We prefer not to present any data until the tests are complete. There is no question, however, that the results are sensational."



DISPLAY ENGINE shown by Chrysler along with its K-310 dream car was a dressed-up version of experimental power plant. As shown, engine would turn out 310 hp. on ordinary gas.



NEWEST CHRYSLER EXPERIMENT. Custom-built in Italy, this convertible was designed by Chrysler engineers to blend European sports-car styling with American engineering features. You can't buy one like it, but it certainly is a signpost to future designs. Will it be used as a test vehicle for a high-output engine? Chrysler isn't talking.

Next Stop 400 Hp.?

The Chrysler people are still not saying just what they found. But they do not deny that the output might be around 400 hp.

What do they intend to do with all this power? Chrysler does not suggest putting it into highway cars; such power is practical only on the tracks.

But power can be used for purposes besides speed. In the Chrysler tests, the efficiency of the engine rose right along with the power. If carried to production engines, this would enable you to make fewer visits to the gas pumps.

The manufacturer could also translate the extra horsepower into a more compact engine. With a smaller engine, the whole car could be made smaller and cheaper. END

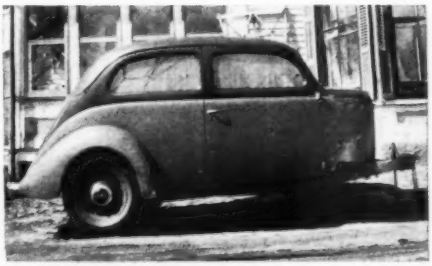
Do you save copies of PSM? See the index of Mechanics & Handicraft articles in Volumes 159 and 160 on pages 187 and 191.

SETTING OUT ON VACATION, here's how we look. The trailer originally was a 1937 Ford two-door sedan picked up at a junk yard, with fairly good tires, for $10. I chose this car because it is light and has an all-steel top and body and a good-size trunk.

My Trailer Is an Old Car

By G. E. Griswold

Stripped of its engine, front end and seats, a 1937 Ford gives me perfect sleeping accommodations for camping trips.



MODIFICATIONS I made can be seen in close-up view. Everything unnecessary was discarded—engine, entire front end (including steering wheel and post), running board, drive shaft, pinion gear. Hand brake was left hooked up and a plug installed to connect tail light to the electrical system of the tow car.

AT THE FRONT, cross member was removed from frame and the sides bent together and welded to a trailer hitch. I then installed a screw-type jack in the angle of the frame to support the trailer. The hood was simply bent down and welded to the sides of the frame.

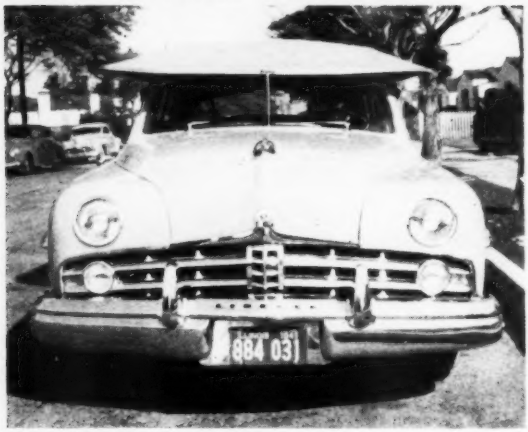
INSIDE OF CAR offered enough space for a three-quarter bed spring after removal of seats. Back of rear seat was left, however, as a back rest for reading in bed. After I removed the window moldings and installed screening, my wife put up the curtains that you see above.

What I Gained: The entire trailer cost me only $32.50. The excess above the $10 car cost went for welding, the hitch and jack, bed spring, screening and paint.

The job took me only a fraction of the time that would have been required to build a conventional trailer.

Weighing less than 850 lb., the trailer handles well and never has taxed the tow car in any way.

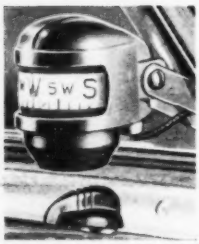
For Your Car...



Sun Hat Cools Car

DESIGNED for use in desert areas, this allover visor allows air to circulate between it and the top of the car, carrying away heat that otherwise would penetrate into the car. Hooks and suction cups attach it, and the frame keeps it 5" above the car roof. The visor extends about 20 inches over the windshield, and also shades the rear glass. Made of canvas or plastic on a steel frame, it weighs 28 pounds. *Dr. O. M. Williamson, Sedona, Ariz.*

Compass Has Light Inside



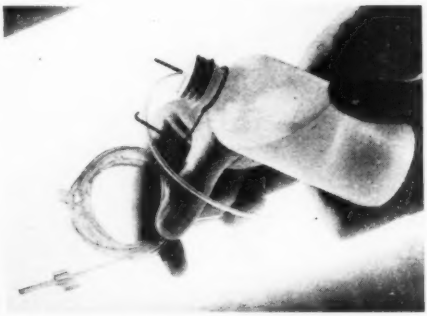
AN ILLUMINATED car compass for mounting on the windshield divider is a Pontiac accessory. It comes in a chrome-trimed gray plastic case. The lamp is wired to the car's electrical system.

Magnet Holds Pencil on Visor

HERE is a combination mirror and note pad for mounting on the back of the sun visor. A magnetic pencil clings to the Visor Wizard mirror frame. *Dreer's, 1934 Arch Street, Philadelphia 3.*

Armrest Gives Storage, Too

BESIDES providing a padded spot for your elbow, this armrest opens up for storage of maps and other auto odds and ends. A wire holds it in place. *Car-Y-All Co., 89-70 220 St., Queens Village, N. Y.*



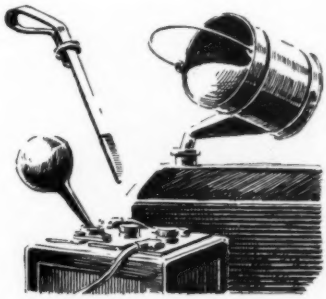
Squeeze Washes Windshield

SQUEEZING this plastic bottle sprays water over the windshield from holes in the plastic tubing. Squeeze Me hooks to the instrument panel; the tubing runs through the fire wall or between the door and frame, and clips to the lower edge of the windshield. It fits all cars. *Denton Hassel Co., Ferndale 20, Mich.*

Auto Care on the Highway

You have to watch more than the scenery for a pleasant trip.

SET A DEFINITE TIME to service your car each day so you won't forget. Before starting out in the morning, while the family is having breakfast, or the first rest stop after breakfast are all good choices. Besides filling the gas tank, remember these other points:



1 ADD AIR TO TIRES IF NEEDED. Gauge them first thing in the morning before moving car—while tires are cold. If you can't add air immediately, make note of how many pounds any tire is below recommended pressure. Then, at service stop, add just this many pounds—even if it brings the total above approved "cold" figure.

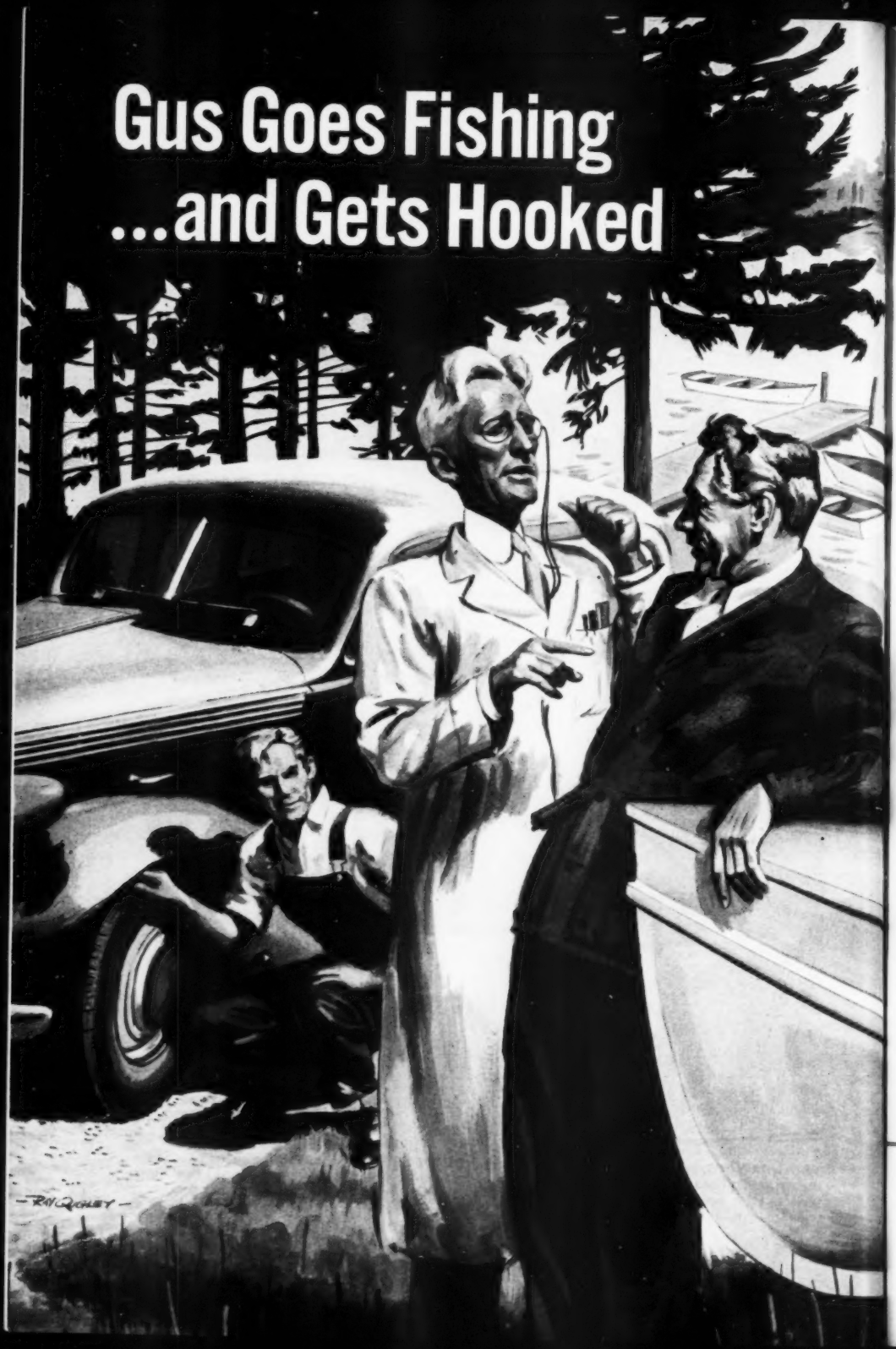
2 CHECK OIL, WATER, BATTERY. Remember that on one day of touring your mileage may equal weeks of ordinary driving. Check oil every time you refuel—even if your car never burns oil.

3 EXAMINE ENTIRE CAR quickly while attendant is cleaning windshield. Visual inspection can uncover such things as tires worn by misalignment, a loose or worn fan belt, or an oil leak around a gasket. Make sure stoplight and turn signals are working properly.

WHILE DRIVING, keep your eye on the ammeter and oil and temperature gauges, as well as the scenery. They are there to warn of trouble in the making.

DON'T REFUEL in the afternoon or evening on very hot days if you can possibly avoid it. The summer sun expands gasoline in underground tanks and you get less fuel energy from each gallon.

Gus Goes Fishing ...and Gets Hooked



All Gus wanted to do was fish but he couldn't resist the temptation to show the stiff-necked, mule-stubborn Dr. Angus that it takes more than theories to fix a balky car.

By Martin Bunn

AS HE steered around a sharp bend in the narrow dirt road, Gus Wilson finally caught sight of what he had driven more than 200 miles to find.

It wasn't a big lake, but it looked like the answer to an angler's prayer. It had weed beds, sunken logs and a nook-and-cranny shore line. Everything about it spelled FISH. And that's just what Gus, with a few days off from his Model Garage, was after.

"Now to find that little hotel Jim Worden told me about," he muttered happily to himself, "and I'll be all set."

Driving on slowly he came to a winding lane that led down toward the lake. And sure enough, right there on the shore was a long, low one-story building.

Hotel Appears Deserted

Gus parked in front of the hotel. There were two other cars, and as he unloaded his gear he noticed that the front end of one was jacked up, with the front wheels and hub assemblies missing.

When he got no response to repeated knocking, he opened the door and walked in. No one seemed to be around so he settled himself in a big chair to wait. The only sound was a low humming noise that seemed to come from a hall leading off to the left.

Suddenly the humming stopped and Gus heard a door slam somewhere. The next thing he knew a tall, spare, bespectacled man in a long white coat was standing beside his chair peering down at him.

"I am Alvin Angus," the stranger said evenly. "And what can I do for you?"

Gus, a little taken aback by the man's sudden appearance, was annoyed to find himself stammering. "Why—er—I'm Gus Wilson, a friend of Jim Worden's. He suggested I come up here for a few days' fishing. This *is* a hotel, isn't it?"

"Yes indeed. I have a vacant room right down the hall. Please follow me."

Feeling a bit nonplussed, Gus picked up his gear and followed.

Angus stopped in front of the second door along a narrow hallway and swung it open to reveal a neatly furnished room.

"Here you are, Mr. Wilson. Dinner is at seven. If you need anything in the meantime, I'll be in my laboratory."

Gus was about to ask, "Where is that?" but before he could get the words out of his mouth the man was gone.

"Mighty odd character," thought Gus as he unpacked. With his white doctor's coat and "laboratory," Angus made the place seem like some sort of sanitarium instead of a fishermen's retreat. But if the fishing was as good as Jim had bragged it was, Gus didn't care if Dracula himself ran the place.

Gus Meets a Fellow Fisherman

A few minutes later, fishing rod in hand, he strolled contentedly down toward the lake. A pleasant-looking middle-aged man was just easing a skiff up to the dock.

"How's the fishing?" called Gus.

"Wonderful!" The man held up a couple of good-sized bass.

"I'm Gus Wilson," said Gus as the fisherman clambered up on the dock.

"Glad to know you. I'm Bill Plummer.

"I hardly think you could be of much assistance in this case, Mr. Wilson," Dr. Angus said coolly.

Planning to spend a few days up here with the good doctor?"

"Doctor?"

"Yeah, Dr. Alvin Angus—the fellow who owns the hotel. Haven't you met him yet?"

"Well—yes. What is he—a physician?"

"Oh no, he's a retired scientist. He runs this place, and he spends a lot of time in what he calls his laboratory—it's really more like a glorified workshop. Incidentally—" Plummer grinned—"don't get into an argument with Angus. He's the kind of guy who's always right about everything."

Fish Jump Right onto the Hook

The fishing *was* wonderful. In a little over an hour, Gus reeled in a largemouth bass and a couple of nice lake trout.

That night he got a chance to talk to Dr. Angus. After a good dinner, served by a widow neighbor who cooked the meals, he, the doctor and Bill Plummer settled down on the back porch overlooking the lake.

Under Gus's friendly prodding, the doctor unbent a little and told how he'd spent many years as a research physicist and university professor. Then he had retired on the advice of his doctors and opened the fishing camp.

"After a lifetime of that sort of stuff," Gus put in sympathetically, "you must find it pretty dull catering to a bunch of guys who don't want to talk about anything but fishing. After all, scientific research is a pretty special kind of business. Most of us don't know much about it."

"But you should," snapped the doctor. "That's just the point. There is a scientific approach to every subject. I find, for example, that the practical problems I deal with in my laboratory yield to analysis exactly the same way that purely theoretical ones do."

Gus was getting interested. "That's certainly true up to a point." He was thinking of how he had licked many a tough problem at the Model Garage by just lighting his pipe and sitting down to think it over. "But of course you've got to have a lot of practical knowledge and experience before you can start analyzing."

"Can't agree with you on that. Fundamental principles apply to everything. No specific experience required."

Gus Beats a Hasty Retreat

Gus caught the sly grin on Plummer's face and suddenly remembered his warning about arguing with the doctor.

"Perhaps you're right, Doctor. I hadn't thought of it just that way. Well, I guess I'll turn in—want to get an early start on that fishing tomorrow."

Dr. Angus seemed somewhat mollified. "Come see my lab for a minute. Like to show you some of my equipment."

The doctor's "laboratory" was as neat as a laboratory should be, and elaborately outfitted. On one side of the room was a complete metal shop right down to a small shaper. On the other was a fully equipped woodworking shop.

Gus whistled admiringly. "This is really something. What sort of work do you do in here?"

"Oh, I've made some furniture for the hotel, and various odds and ends. And lately some of the local people have discovered that I have this shop and have been bringing me their repair problems. Only today, a chap who lives down the road brought his car in. He had bought a set of brake shoes by mail but when he started to install them he found his front-wheel drums badly scored. Asked me if I'd turn them down. I did so. And by the way, Mr. Wilson," Angus went on, waggling an emphatic finger, "that's a case in point. I know very little about automobiles but I predict that Clem Lamson's brakes will now operate perfectly."

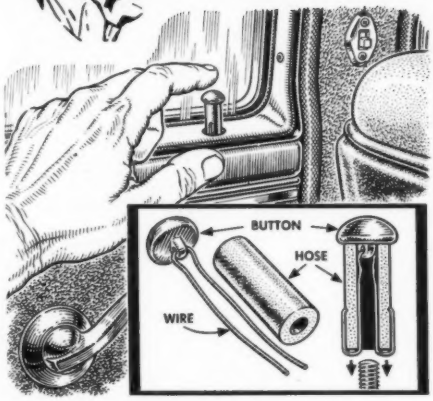
Dr. Angus Runs into a Problem

Gus recalled the jacked-up car out in front of the hotel. "Well, no doubt you're right," he said mildly. "See you tomorrow."

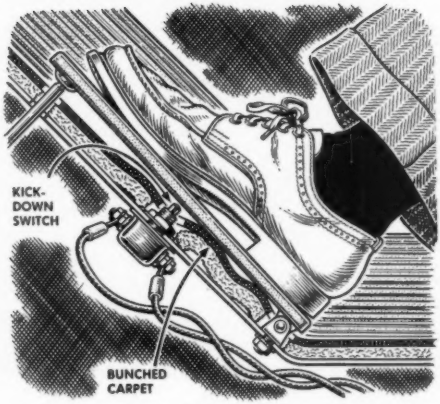
Up early as usual next morning, Gus decided to take a walk before breakfast. As he opened the screen door, he heard voices raised in argument. The doctor and a man in overalls were crouched down beside the left front wheel of a car in the driveway.

[*Continued on page 198*]

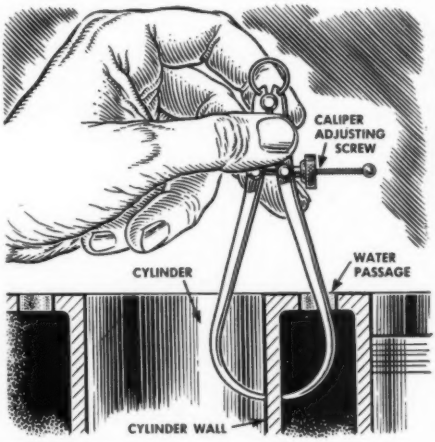
Hints from the Model Garage



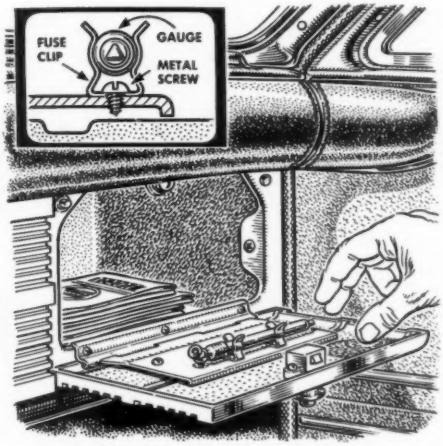
If a door-lock knob breaks and a factory replacement is not available, cut off a short piece of windshield-wiper hose. Loop a piece of copper bell wire through the eye of a dress button about the size of the original knob, push the wire through the hose, turn up the ends and force the assembly over the threaded control rod.



Carpet bunched under the accelerator may make it difficult or impossible to kick down an overdrive transmission from fourth to third to get maximum power. The owner of a car with an automatic transmission may have similar trouble because the pedal is set so low that it bottoms before operating the down-shift switch.



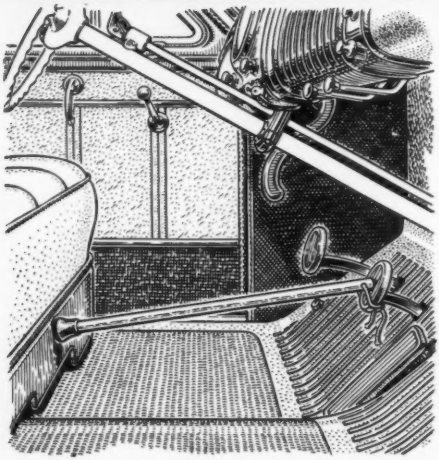
While reboring a cylinder, you can measure the wall with calipers. Put one prong through the water passage and turn up the calipers. Mark the screw setting with a fine pin, take out the calipers, reset the screw and measure between the points.



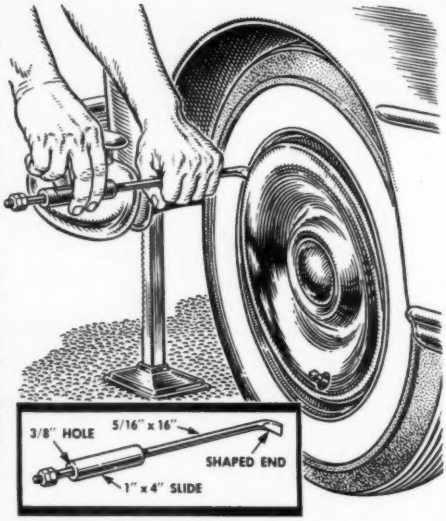
A tire gauge mounted on the inside of the glove-compartment door with a pair of fuse clips will not get lost among the odds and ends in the compartment. Spring clips suitable for the purpose usually cost only a nickel apiece. Fasten with screws.

Please turn the page for more auto hints.

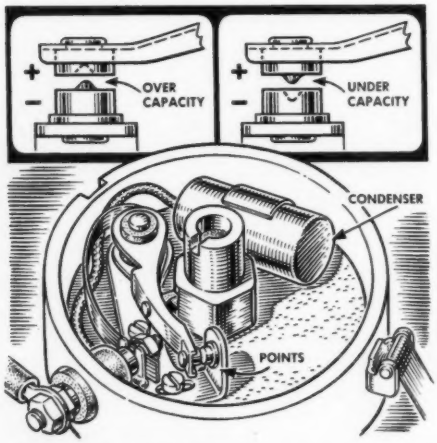
MORE Hints from the Model Garage



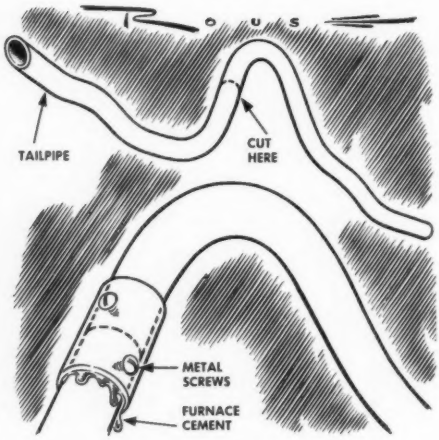
Changing a front tire will be safer and the wheel won't revolve if you first set the brakes with this broomstick arrangement. Cut the stick to the correct length, put a crutch tip on one end and loop cord through a hole in the other. While a front wheel is jacked up you then will have the safety of three locked wheels instead of only two.



A hub cap will come off easier and there will be less chance of marring the wheel paint if you make a tool like this and add it to your car kit. Ramming the slide against the nut while the hook is under the cap rim does the trick. The tool can also be used to remove front-wheel bearing caps that are pressed in place.



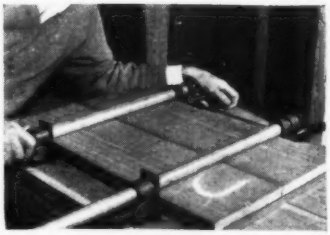
Pits in distributor points are a sign that the condenser is of the wrong value. If the positive point pits and the negative one builds up, the condenser is probably over capacity. If it's the other way, the condenser value is too low.



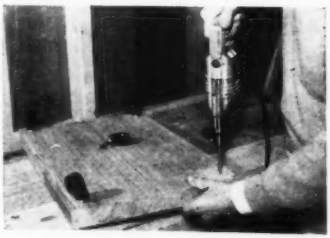
A tailpipe sometimes has so many twists and turns that putting a new one in place becomes a problem. If nothing else works, it may help to saw the pipe in two and later, after the parts are in place, join them with a metal sleeve and furnace cement.

Terrace Wagon Serves Outdoor Meals

Three spacious shelves let you bring out the whole dinner on wheels. Hand tools make this rugged cart.



1 GLUE UP narrow boards to form the shelves. Follow dimensions for the top and bottom, but take measurements for the center shelf from the table itself.



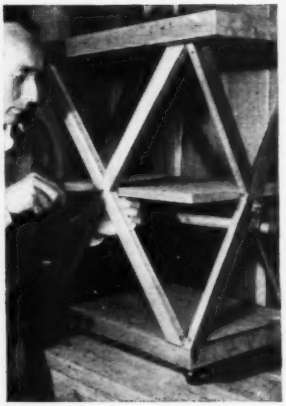
2 ATTACH CASTERS near corners of bottom shelf. This type fits into 3/8″ blind holes; other types are screw-fastened. Use 2″ rollers with ball-bearing swivels.

3 SIDE BRACES are glued and screwed flush with corners of lower shelf. Use one 1½″ wood screw at each corner and predrill braces to prevent splitting.

ROLLING on ball-bearing casters, this serving cart lets the hostess join the fun of porch or terrace dining. It stands up to outdoor weather but doesn't look out of place indoors.

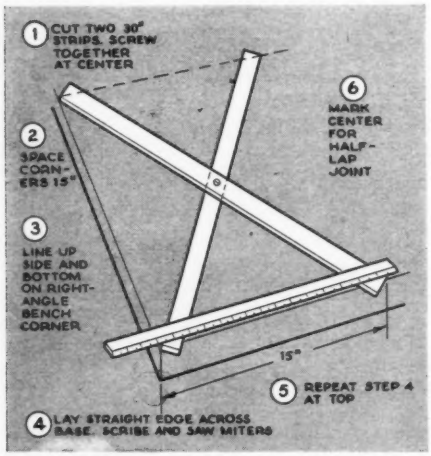
The wide panels for the shelves are made by edge-gluing redwood boards. Use 1⅝″ stock for the top and bottom, ¾″ for the center shelf and cross braces. Cut an 18½″ by 31″ blank for the top and a 15″ by 22″ for the bottom. Sand them smooth and attach wheels to the lower shelf. If the porch or patio is smooth and hard, large casters will do, but if the

4 TURN TABLE OVER, center braces under top shelf and attach them the same way. Note glued half-lap joint where crosspieces meet.



5 MIDDLE SHELF, cut to fit, is glued and screwed to braces. Braces should cross at same height, but level the shelf before you screw it on.

6 RAIL, bradded to top, keeps things from sliding off when table is being moved. Enclose sides and back only, mitering corners.



cart is to be rolled on the lawn, better use 4″ or larger rubber wheels.

Next, cut four ¾″ by 1½″ by 30″ pieces for the side braces. Screw two of them together at their centers and mark off the corner miters and the half-lap joint as shown at the left. When you have trimmed the corners and cut the lap, reassemble the brace and use it to mark the second one.

Glue and screw the side braces to the lower shelf so all four feet square up with the corners. Turn the assembly upside down and center the braces on the upper shelf.

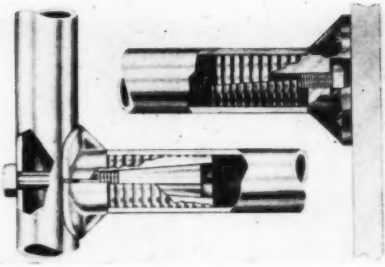
Make a brace for the back from 32″ pieces and fit it between the side braces. Cut the center shelf to fit between the legs. Sand the cart, rub it with linseed oil, and finish it with a coat of hard wax.—*John Rogers, Dallas.*

Towel Rack Holds Sander Belts

A DIME-STORE towel rack on my shop wall holds the belts for my portable and bench sanders. The rack keeps the belts straight, stores them near my work and lets me quickly choose the size and grit I need for any job.—*E. P. Alexander Jr., Plymouth, Mass.*

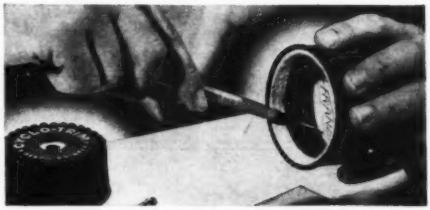
Workshop Wisdom

His chisel was dull, but more muscle
Would get the job done, thought
Joe Fussel.
The edge didn't cut
Where he meant it to, but
Instead took a slice out of Fussel.



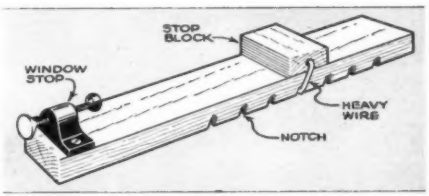
Coupler Can Be Re-used

As THE connecting bolt in this cast-iron tubing coupler is screwed tighter, two wedge-shaped metal pieces are pressed tightly against the inside of the tube. Turning the bolt counterclockwise releases the wedges and lets the coupler slip out of the tube. Two models are made by the Belvidere Aluminum Co., Rockford, Ill., to join tubing and to attach tubing to a flat surface.



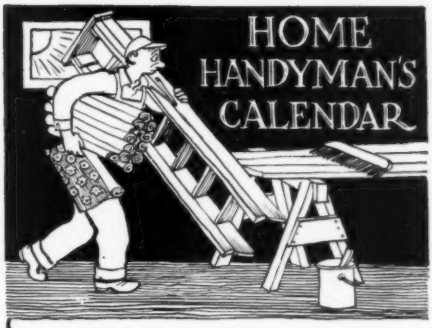
Sharpener for Draftsmen

A SILICON CARBIDE abrasive surface on the inside of this cylindrical holder quickly gives pencils a sharp point. It also dresses divider points. After pointing, pencils can be cleaned by wiping them across a strip of felt that is glued inside the cylinder. Franz Patent Laboratories, Oakland, Calif., makes the sharpener.



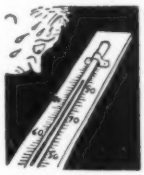
Window Stop Makes Clamp

CLAMPS like this are inexpensive to make and very useful for clamping broad surfaces. Use several of them side by side. The stop block can be adjusted to work of different widths by shifting the wire loop.



July brings hot, sunny afternoons when it's more fun to loaf in the shade or work indoors. And, with proper planning, you can do just that. This is a good time to do interior painting and papering. Paint should last three to five years in cities, longer in suburbs; but you don't have to do all the painting in one season.

- Your cellar may be the coolest spot in the house this month and a pleasant place to work. Take advantage of that natural air conditioning and July's dry weather to install a sump pump and drains. If condensation in warm, humid weather makes your cold-water pipes sweat and drip, here's your chance to eliminate the trouble by covering pipes with insulation.



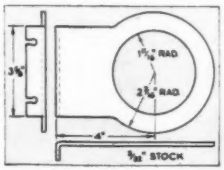
- Check your refrigerator and freezer mechanisms now, particularly belts and motors. Oil all motors and fans. Have a serviceman replenish gas supply of freezing units if bolts around compressor gaskets are loose.
- This is a good time, too, to lay floors of linoleum or asphalt tile. And be sure to check furniture to see that all legs are resting on gliders that won't injure floors.

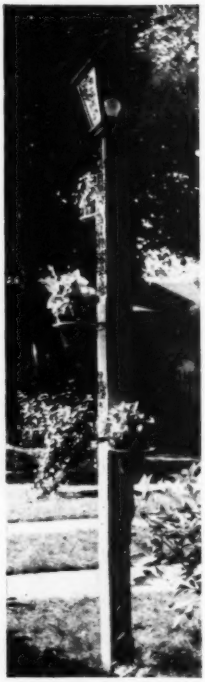
Tin-Snip Guard Saves Fingers

A SIMPLE leather guard on metal shears will save your knuckles from scratches and cuts. Use a piece of leather about ⅛″ thick. Shoe-repair shops usually have such scraps. Fasten the guard to the lower arm of the shears with staples or stiff wire. Clinch the staples or wire with pliers. You can make a similar guard for the upper part of the shears, but it isn't necessary, since you can usually bend waste metal away from your thumb as the cut progresses.

Brackets Hold Flowerpots

ALL summer these brackets hold flowerpots to decorate the lamppost in my front yard. When cold weather comes, it's a simple matter to slip the brackets off the mounting screws and hook them over other screws in the kitchen. I used a bandsaw to shape the brackets of 3/32″ aluminum. The openings for the pots were made with a fly cutter, and the slotted holes with a drill and file. I painted the pots a bright red.—*W. M. Hine, Lynbrook, N.Y.*



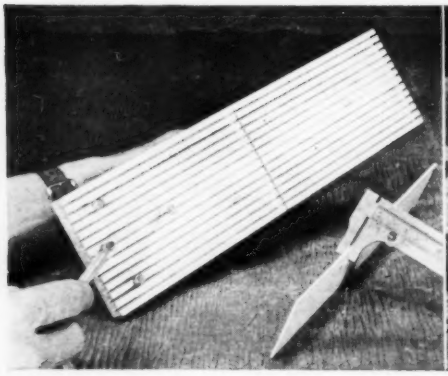


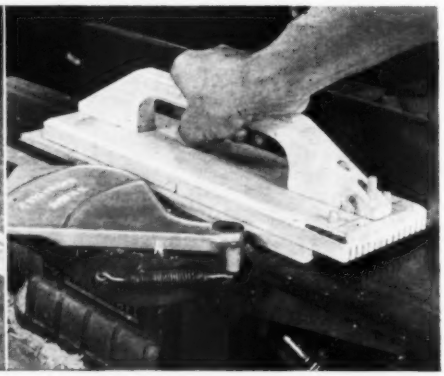
Play It Safe: Use a Pusher on Your Jointer or Sander

SURFACING a thin board on a jointer or belt sander can be a dangerous job—even for an experienced craftsman. It's best to use a pusher that keeps your fingers well away from the knives or belt.

This pusher applies even pressure on the work and will handle stock as thin as 1/32″. Make it of ¾″ wood about 4″ by 6″ by 12″, depending on the size of the jointer. Cut saw kerfs in the underside to minimize warping. Glue and dowel a handle to the top side.

Three ¼″ dowels near the rear of the pusher move the work over the knives. Don't glue these dowels in place. Then they can be tapped up or down to suit the thickness of the work. Use the center dowel alone for narrow work, pushing the other two up.—*H. L. Truchelut, Atlanta.*





Picnic Table Is Carrying Case for Charcoal Grill

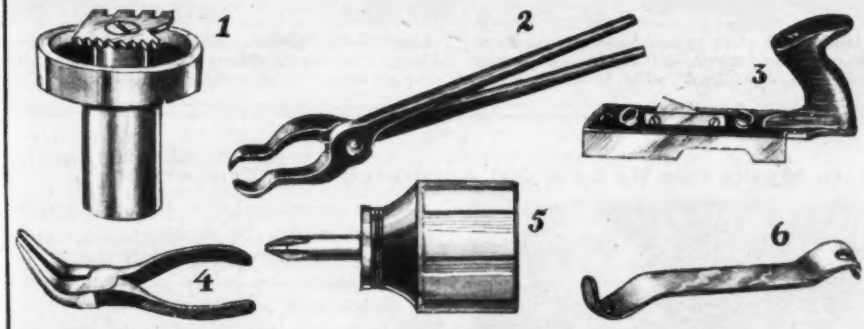
WHEN we go to the beach or on a picnic, this flat case carries the charcoal grill and then unfolds to form a sturdy table that is just the right height to eat from when you're sitting on the sand.

Dimensions, of course, will have to suit the particular charcoal grill. I built this one of ½″ and 1″ stock with the ¼″ hardboard table top rabbeted into the framing pieces. The legs are 1″ pieces hinged inside the frame. The case is finished with luggage corners, and luggage snaps hold the halves together for carrying.—*Norman C. Branch, W. Hartford, Conn.*

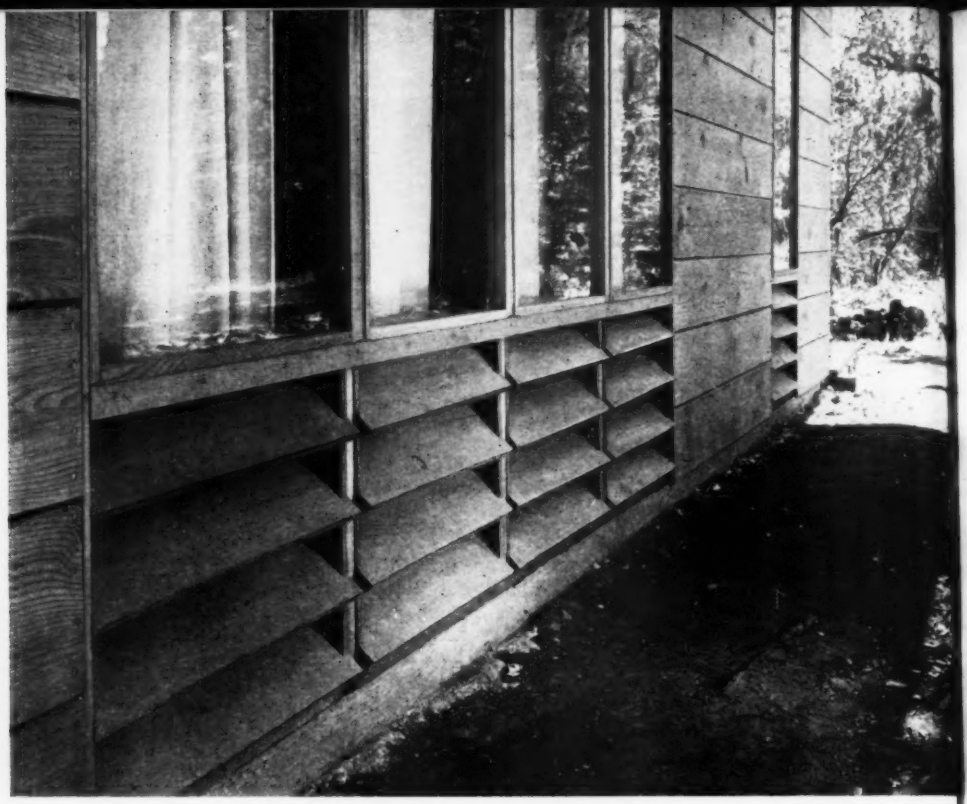
TOOLBOX TEST

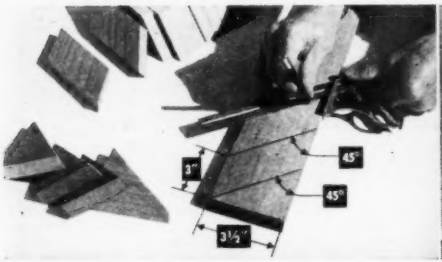
Sharpen up your knowledge of shop tools. Name these and invert the page to score yourself.

By C. B Colby

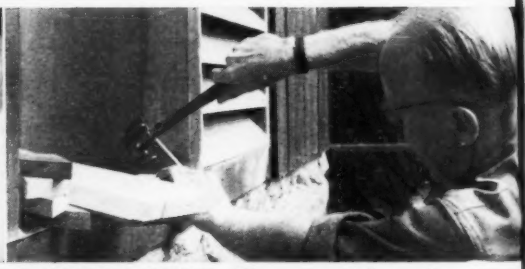


1. Bench hook; 2. Hot-rivet tongs; 3. fiberboard beveling plane; 4. curved long-nosed pliers; 5. stubby Phillips screwdriver; 6 woodworker's cornering tool.



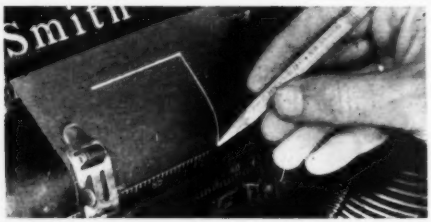


PRELIMINARIES. Cut spacer blocks from stock wide enough to match wall thickness. Louver boards can be 6″ or 8″ wide, beveled or not.



TRIANGULAR BLOCKS. These are right-angle blocks the same width as wall thickness. Nail one on each side at bottom of opening.

Photo Masks Can Be Laid Out Accurately on a Typewriter



BLACK paper masks for contact printing or enlarging can be drawn quickly and accurately on a typewriter. Place the paper in the machine and hold a pencil firmly on the platen scale, as at left. Move the carriage to make a horizontal line and turn the platen knob to make a vertical line. Then cut out along the lines.—*John J. Rea, Urbana, Ill.*

We're in Love with Louvers

You save time, work and money by making windows just to look through and using other openings for ventilation.

HINGED DOORS. Insect screening covers inside of louver opening. Hinged door, held in open position by chain, deflects drafts upward.

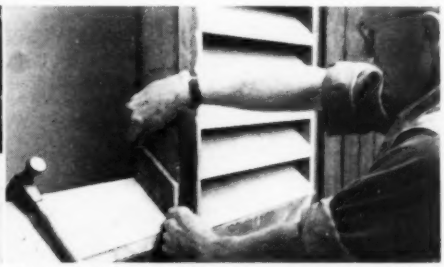
LOUVERS—an old, old architectural gimmick—are coming into their own again. We have built three houses with louver construction and we will never build another home without them. You often find them today on modern homes. They are so easy and quick to install and the ventilation they give is so efficient that you should remember them when you are doing a remodeling job or maybe building a summer cabin.

With louvers, your window-construction job is a cinch. You just use fixed windows—set right into the building framing. No sliding or hinged sash, no window screens or hardware are needed.

Construction. If you can nail two boards together, you can install louvers. Fixed louvers—like those shown in the photos—are only a series of identical pieces that cut readily from stock lumber. After the pieces are sawed to size, you just nail one piece on top of the other. You have no spacing or fitting problems.

Lumber sizes. When the opening calls for boards no more than 3′ long, nominal 1″ stock works well. With lengths greater than 3′, there is danger of warping. Better use full 1″ or even nominal 2″ lumber.—*Paul Corey and Darrell Huff, Sonoma, Calif.*

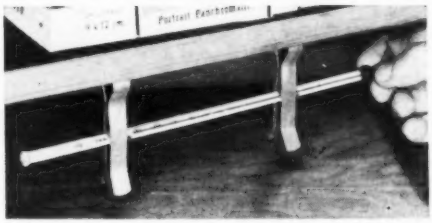
LOUVER BOARDS. Place first louver board on right-angle blocks. Toenail board to frame. Driving nails into blocks might split them.



SPACER BLOCKS. These go on top of each louver board. Nail them to frame of opening. Add boards and blocks until job is finished.

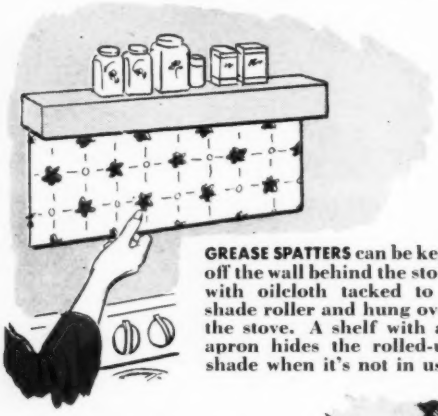
Aluminum Clothespins Form Rack for Storing Small Tools

A STIRRING-ROD thermometer can be safely and conveniently stored beneath a darkroom shelf with two aluminum clothespins, as shown in photograph at right. Drill a small hole in the tops of the pins and attach them to the shelf with wood screws. You also can store a ruler or other small tools in your shop with the same kind of clothespins.



Keeping the Home Shipshape

YOUR HOUSE NUMBERS will be plainly visible at night if you fasten an extra set to the screen door or a window screen. Lighting from inside the house will silhouette them.

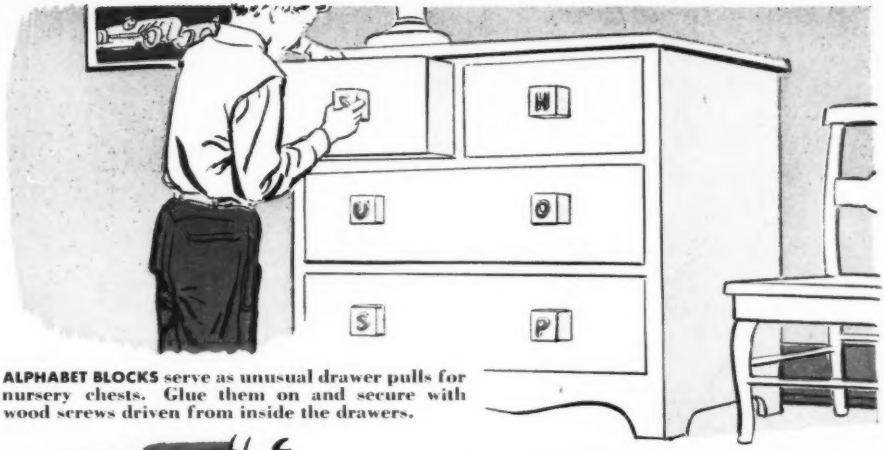


GREASE SPATTERS can be kept off the wall behind the stove with oilcloth tacked to a shade roller and hung over the stove. A shelf with an apron hides the rolled-up shade when it's not in use.

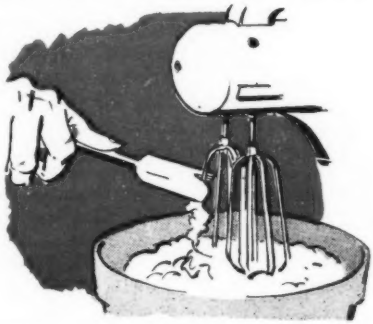
SALT-SHAKER TOPS of silver are less liable to discolor if coated on the inside with paraffin. Pour melted wax into the tops and when it has hardened prick through the holes with a pin.

KNEELING PADS for gardening can be cut from inner tubing. Cut two pieces the desired length. Slit them open at the back, leaving two uncut bands at top and bottom to hold the pads in place on the legs.

A COFFEE POT makes a paint container with a convenient handle. It's easier to hold than a can, and your hands stay clean even if paint runs down the sides.

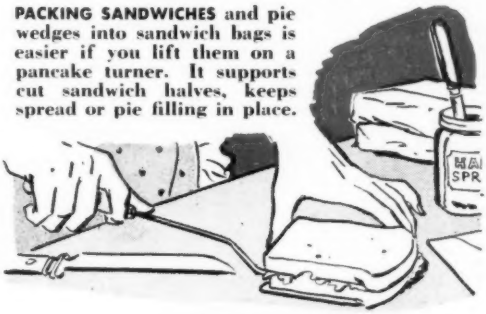


ALPHABET BLOCKS serve as unusual drawer pulls for nursery chests. Glue them on and secure with wood screws driven from inside the drawers.



GETTING ALL THE BATTER from the mixer blades is easy if you use a bowl scraper with a V-shaped slot cut in it.

PACKING SANDWICHES and pie wedges into sandwich bags is easier if you lift them on a pancake turner. It supports cut sandwich halves, keeps spread or pie filling in place.



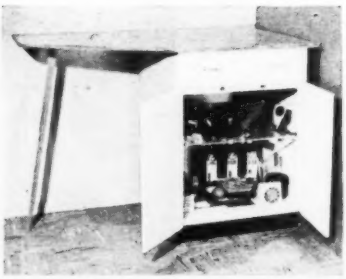
A GARDEN BASKET like this is handy for gathering cut flowers. Just poke a cane through a wicker basket. A wooden collar on the cane will keep it from slipping down.

TABLE LEAVES can be stored neatly on the back of a door. Two cleats spaced to take the leaves are screwed to the door. Turn buttons on the ends of the cleats keep the leaves from sliding out.

PICTURE MAKING BEGINS when cooking ends in this model kitchen. Built-in features enable photographer to get going without wearisome preparation. Counter top resists chemicals.

Kitchen Doubles as Photo Darkroom

Built-ins ease the photographer's job without disturbing the cook.



PLANNING DESK stores essential photo equipment and leaves drawer at top free for wife's household records. For darkroom session, the photographer can quickly set up an enlarger on desk. During day, wife can use it as extra work surface or as a desk. Desk shown was made by placing plywood on top of standard base cabinet. For finished appearance, top could have linoleum or plastic covering and molding on edge. Angle brackets fasten leg to plywood.

MANY an amateur photographer still is plagued by the housing shortage. Even though he lives in a brand-new home, chances are it is the expansion-attic, 1½-story type built on a concrete slab, and he has no convenient place to set up a darkroom.

As a solution to this problem, two leading manufacturers have designed a modern kitchen that also doubles as a darkroom. It provides work and storage space for the photographer and is arranged to keep the hypo out of the bean soup and, perhaps, make a photographer out of the housewife too.

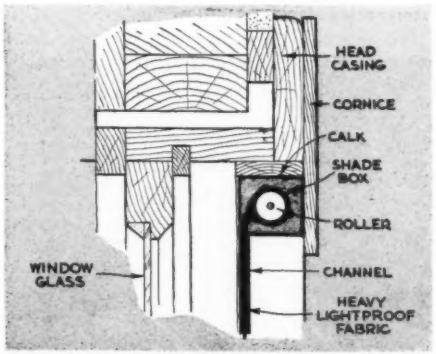
It's a kitchen first. The model room set up by the General Electric Home Bureau and F-R Corp. looks like any other spic-and-span modern kitchen. The planners wanted it that way, for a major objective was to keep from interfering with normal kitchen activity. But looking closer, you find many little tricks and gimmicks to please the photographer of the family.

You can black out the room in full daylight simply by pulling down a heavy-fabric shade, camouflaged behind a good-looking valance. The shade, made and sold for the purpose, is a pleasing green color instead of the black you might expect.

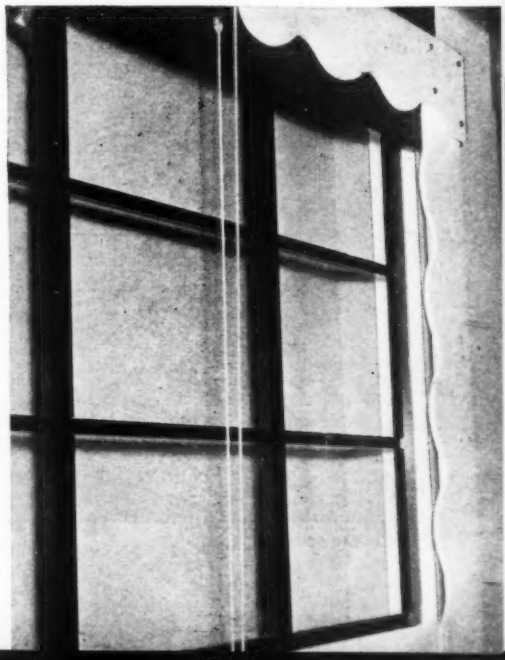
Two electric-light sockets, with separate switches, are located under the base of a wall cabinet. A red bulb in one serves as a safelight. A white light in the other can be used to make contact-print exposures in a printing frame resting on the counter below. Convenience outlets under the cabinet can be used for a toaster, an electric percolator, a print timer or an enlarger.

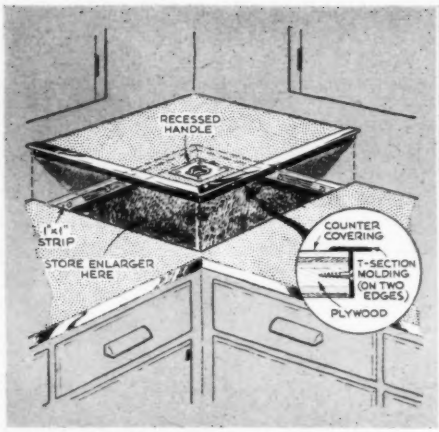
Over in one corner of the model kitchen-darkroom is a unit the photographer can call

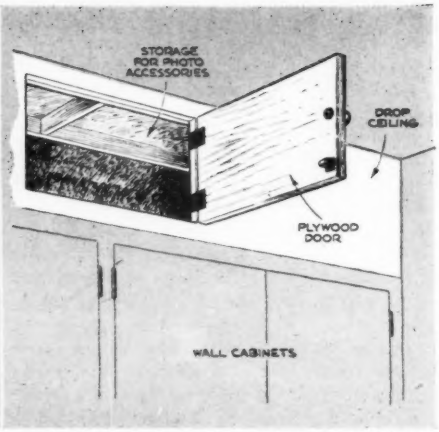
TALL UTILITY CABINET does double duty as film drier when brooms and mops are removed. Small electric-fan heater set in bottom would exhaust moisture through grille in cabinet top.



SPECIAL BLACKOUT SHADE darkens room even at midday. Edges of shade slide up and down in metal channels that act as light traps. A decorative cornice hides shade when it is rolled up. This blackout unit is made by Bar-Ray Products, Brooklyn, N. Y. Doors can be made light-tight with weather stripping. For complete blackout, you must remember to cover up gas-range pilot, keep refrigerator closed.





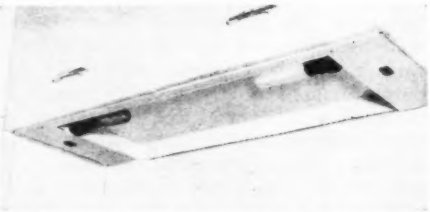


EXTRA STORAGE SPACE for photo equipment might be found in some kitchens as suggested in these drawings. When commercial cabinets are installed along two walls at right angle, waste space is sometimes left in corner. If wall cabinets above do not interfere, a bulky enlarger might be kept in this space. When the kitchen has a dropped ceiling above wall cabinets, a door or two installed there will give space at least for dead storage.

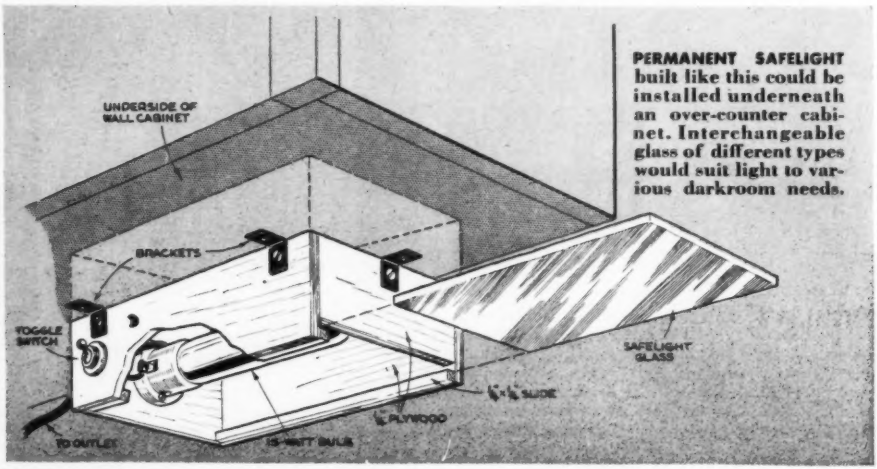
mostly his own. In outward appearance, this is a kitchen planning desk. Nearly all new kitchen layouts nowadays call for one of these—a place where the cook can sit to plan meals, read recipes, keep her accounts and phone the butcher.

The cook can still use this unit for these activities. A drawer is reserved for her use. But the shelves underneath have been set aside for the photographer's equipment.

Don't miss PSM's index of Mechanics & Handicrafts articles for Volumes 159 and 160. It's in this issue, pages 187 and 191.



CONCEALED LIGHTS in base of wall cabinet give housewife good working illumination, let photographer substitute a safelight bulb or make contact-print exposures. The unit has two convenient electrical outlets, too.



PERMANENT SAFELIGHT built like this could be installed underneath an over-counter cabinet. Interchangeable glass of different types would suit light to various darkroom needs.

News from the Camera Shops

Telephoto Couples to Finder

OWNERS of Argus cameras can now switch quickly to a telephoto lens that couples right to the range finder. Developed in Germany, the Tele-Sandmar has four color-corrected elements, click f stops, and a sunshade and filter holder. A special coupler gear, substituted for the original one, permits the new lens to be used with the regular range finder. The helical focusing mount keeps all markings at the top of the barrel. *Geiss-America, Chicago.*

Battery Tester Checks Bulbs

WITH one dual-purpose unit, you can test all sizes of flash batteries and bulbs. When you place a battery in the bracket and press the push button, the round indicator should show more than half green if the battery is perfect. Perfect bulbs also cause the green light to show. Testing does not cause the flash bulbs to fire. *Bright Star Battery Co., Clifton, N. J.*

Photo Adhesive Is Re-Usable

PHOTOGRAPHERS will find a new type of adhesive useful for mounting photos in an album or for holding down projection paper while borderless enlargements are being made. Called Plasti-Tak, it can be used over and over again, and will stick to glass, wood, paper, cloth or metal. It must be prepared for use by pulling it like taffy. *Brooks Manufacturing Co., Cincinnati 24.*

Aprons Develop Miniature Film

Two rolls of 35-mm. or 828 film can be wound in the plastic aprons shown here and then developed simultaneously in the Kodacraft Miniature Roll Film Tank. Once the tank is loaded, all developing can be carried out in full light. *Eastman Kodak Co.*

Low-Cost Scope Has 3 Lenses

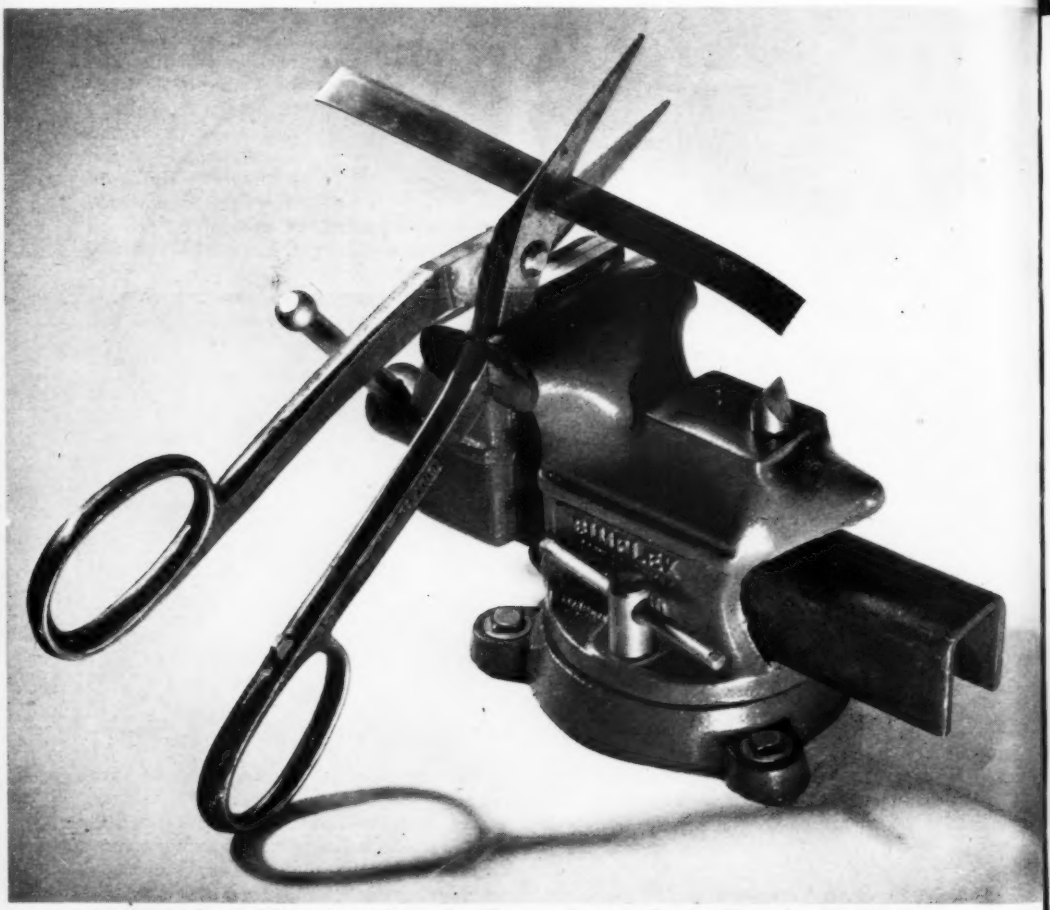
THE revolving turret of this inexpensive microscope gives you a choice of three lenses— 100 power, 200 power and 300 power. It has a fine micro focusing adjustment and an adjustable plano substage mirror. The microscope sells for $14.95, including a hardwood case. *The Akron Co., 4400 Sunset Blvd., Los Angeles.*

17 Extra Uses for Your Vise

By Walter E. Burton

Nothing in your shop is so powerful or so willing to serve.

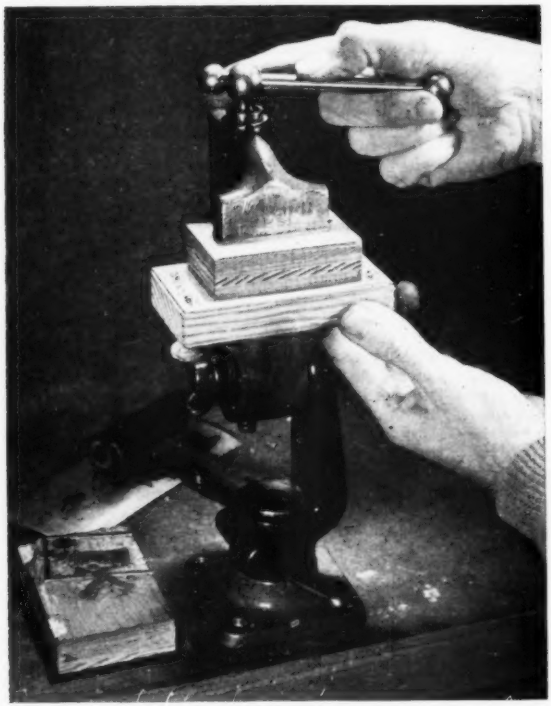
THOUGH you may never have considered it a tool, you've got a powerful helper on the corner of your workbench. A vise will hold your work tenaciously while you hammer and saw and drill. But that's not all it can do. The photos that follow show the bench vise tackling jobs that are far afield from humdrum holding duty.



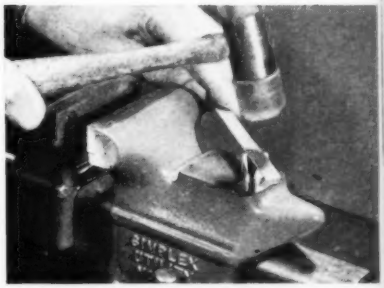
TIN SNIPS, clamped in a vise with one handle resting on the bench, can slice through material that would be very difficult to cut with the conventional grip. Here the strip being severed is a little too wide to be nipped with one blow over the vise cutoff tool on the anvil.

REMOVING DENTS from brass and aluminum ware is one job that even this tiny vise can do. Squeezing is often better than hammering as pressure is controlled and positioning is precise. A hardwood block is used to work inside the flange and distribute pressure.

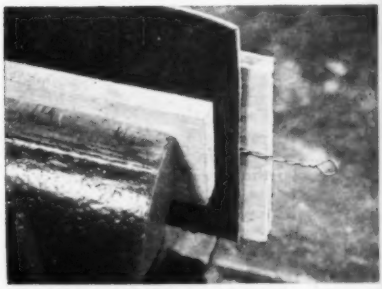
BLOCK PRINTING on a small scale is done by briefly, but firmly, pressing the inked linoleum cut on paper backed with cardboard and plywood. Vise in this photo is an unusually agile woodworker's vise that tilts forward and backward and swivels on its base.



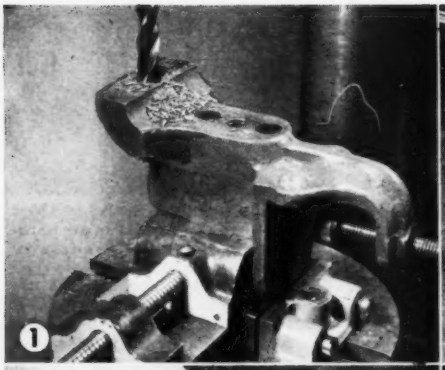
STRAIGHTENING NAILS with a small clamp-on vise beats hammering them out, and saves fingers, too. A vise of this type is handy to have around the kitchen or in the toolbox. It sets up at a moment's notice for the many small jobs that pop up in the home.

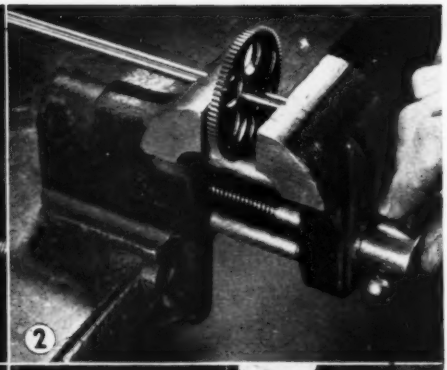


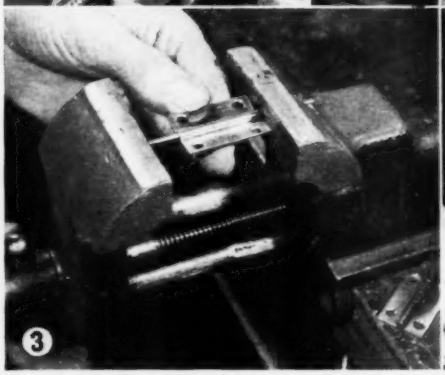
CUTTING OFF strips of metal or wire is a jiffy job for a vise equipped with a hardy—a hardened steel cutoff tool. Similarly, sheet plastic or thin wood may be cut or notched. The cutoff tool can be replaced by stakes of various designs for beating metal into shape.

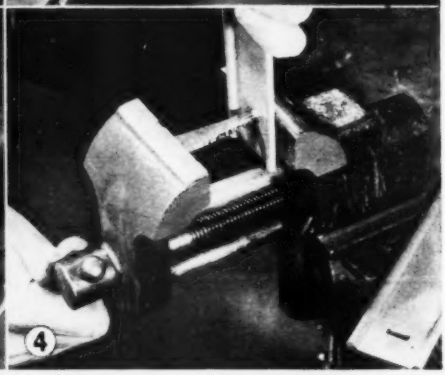


EMBOSSING LEATHER. Twisted wire is pressed into moistened leather to form decorative line. Two pieces of plywood complete sandwich, which is held under pressure until leather dries. Dies and type can also be impressed in this way. *Please turn the page.*





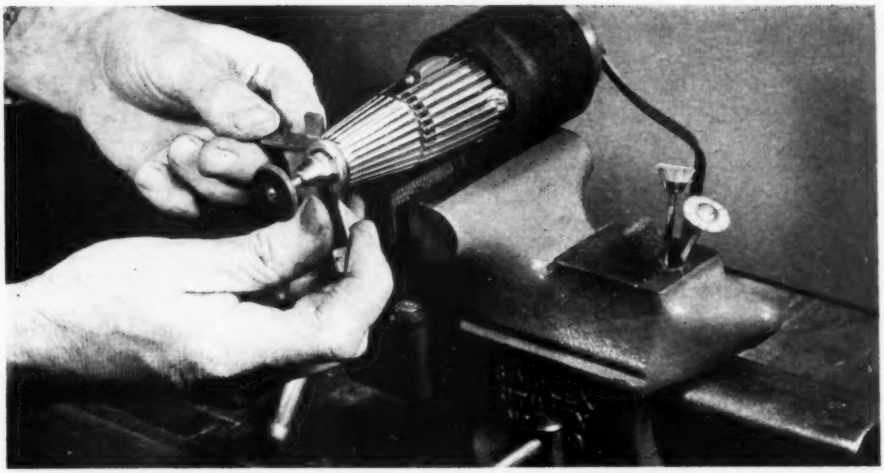




HOLE, DRILLED THROUGH ONE JAW, (Fig. 1) will extend usefulness of vise, making it second cousin to an arbor press. Do not try to drill through a hardened jaw insert; if your vise has them, remove one and replace with a block of mild steel. Pressing gears, pulleys, collars and ball bearings off shafts is light-duty work for average vise (Fig. 2). Ball bearings must be backed up with a ring or washer having a hole the same diameter as the shaft so that pressure will be on the inner race, not the outer one. Removing tight hinge pin (Fig. 3) without damaging or distorting hinge calls for firm, even pressure that is kept under constant control—a natural characteristic of the vise. Nail, with end filed flat, is used to push pin through barrel of hinge, out through hole in vise. Broaching square or rectangular holes with quickly made taper broaches is easy method of producing such openings (Fig. 4). Here again, the hole in the vise jaw permits the broach to penetrate to whatever depth is necessary to produce the desired hole size. Undersize starting hole is drilled in sheet metal and broach is forced into it. Teeth filed in edges cut as broach penetrates metal.

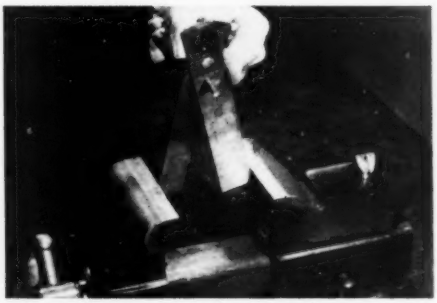
SHAPING SHEET METAL around a rod is first step in producing a homemade hinge. The material should be pressed down into the vise jaws so that the jaw edges squeeze the metal close to the rod, forming a tubular opening for the hinge pin.

COLD CHISEL does clean job of shearing off metal close to the vise jaws. The hinge leaf is notched with a hacksaw and the unwanted sections cut off. Here the two end sections are removed, but on the matching leaf, only the center section will be cut away.



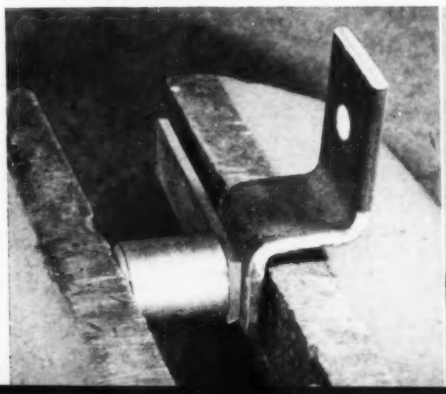
HAND GRINDER is held safely and securely by wrapping it in a strip of leather or fabric-reinforced rubber and clamping the ends in a vise. The socket for the vise cutoff tool makes a convenient holder for keeping small buffing and grinding wheels while you work.

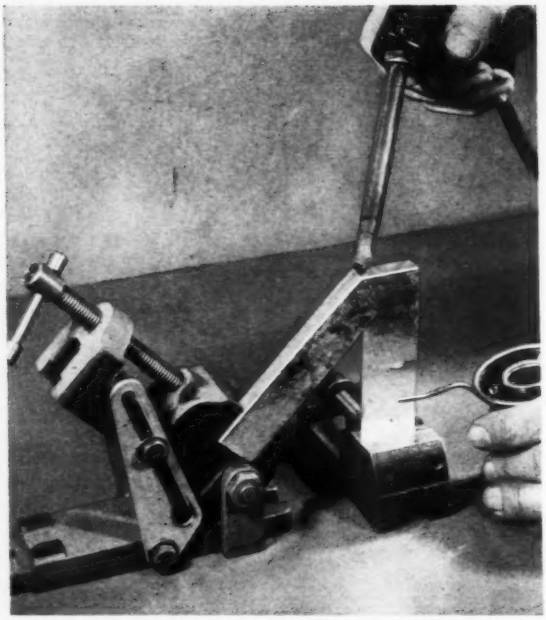
NAILING WITH PRESSURE eliminates hammering close to glass, as on picture frames or mirrors. Felt pad protects finished side of frame. This dodge is also useful for the craftsman working late at night, when use of a hammer for driving nails would disturb others.



SHEARING TOOL cuts rod stock with ease, exerting even pressure as vise jaws are closed. Tool is made from two halves of a flat file, annealed while several sizes of cutting holes are drilled and then rehardened. Drill-rod pivot pin is riveted over on both sides.

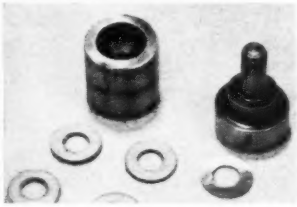
SQUEEZING RIVETS is easy work for a husky vise. Aluminum rivets respond beautifully to the squeeze treatment. The riveting tool is a steel rod having a half-round depression in one end to form the rivet head. At right below is a riveting job and the tool that did it, with the help of the vise. Half-round depression in tool is made by dimpling with a round-nose bit. If tool is used for quantity riveting, make it from drill rod, hardened and tempered to a blue color. For convenience, fasten it to one of the vise jaws. *Please turn the page.*

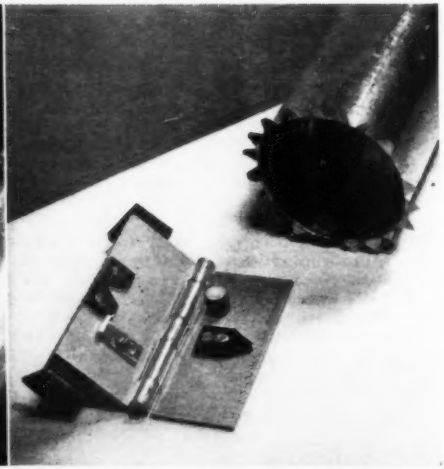




DRILL-PRESS VISES, too, have uses other than holding work for drilling. Here an angle vise is used with a standard vise to bring two parts together for soldering. The angle vise also indicates the angle at which the part is held, and is quickly adjusted to any degree.

PUNCHING HOLES or stamping out washers from sheet metal fully utilizes the powerful forces at your command. Since sheet metal is very difficult to drill cleanly, punching is often the answer to the problem of making truly round holes, especially in the larger diameters. Below is punch and die set, along with some washers stamped out of sheet metal and thin fiber. The tip of the punch forms the hole, and the washer is cut by the next larger diameter. The washers must be removed by hand.

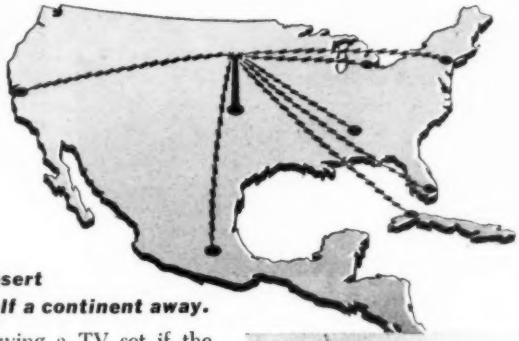




NOTCHING SHEET METAL with a simple notching device set in the jaws of the vise. This process simplifies the bending over of flanges on tubular forms to be soldered, as in the photo at right above. Cuttings should be brushed from the hinge occasionally. Notching tool consists of pair of dies, made from flat tool steel, riveted to a heavy hinge. The L-shaped bracket regulates the notching depth and the rubber button springs the die apart after each cut. The U-shaped spring clip holds the tool in place on the vise jaw.

THIS COMBINATION—Gene Smith and his 16-incher—makes TV history in the heart of Kansas. Four-tube booster on set steps up signal from booster under antenna.

Kansas TV Fan Gets Both Coasts



De luxe rig set up in television desert has logged stations more than half a continent away.

YOU might think twice about buying a TV set if the nearest station is more than 200 miles away. Gene Smith, living in Hoisington, Kan., ordered a 25-tuber with a 16″ screen and hooked it to an antenna 30′ high. He didn't get a thing.

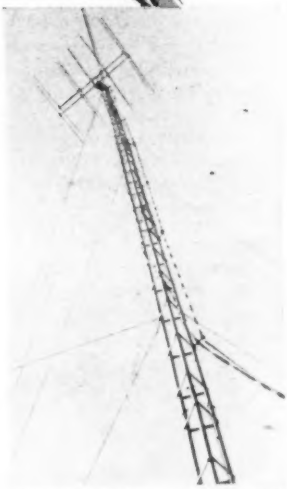
Undaunted, he ordered a one-tube booster, an antenna rotator and a five-element Yagi antenna cut for channel 4. This gave him sound once in a while, but no picture.

Then he moved to Great Bend, Kan., 10 miles away. He put his antenna on a 60′ mast, hooked the one-tube booster directly below it to amplify the signal ahead of lead-in pickup, and attached a four-tube booster to the set.

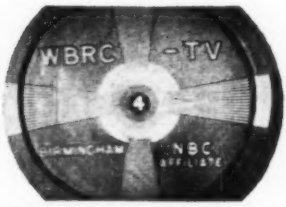
This equipment, which cost him a total of $650, has since brought in 22 stations, including WBRC-TV, Birmingham, Ala. (750 miles), WWJ-TV, Detroit (900 miles), KRON-TV San Francisco (1,280 miles), WNBT, New York (1,300 miles) and XH-TV, Mexico City (1,300 miles).

Smith is proudest of receiving Havana, Cuba, 1,550 miles away. It was clear for 12 minutes. Other far-distant stations have stayed on screen from one minute to an hour.

His unusual reception, Smith believes, results from an ideal location on high ground as well as his extra-sensitive rig. Weather has no predictable effect, but the best times to fish for DX appear to be before noon, in early evening and from 10 p.m. to midnight.

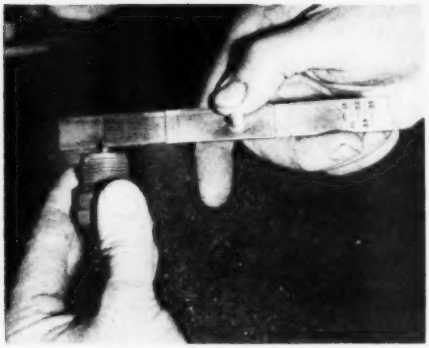


ANTENNA 60′ up is "fished" with a rotator to search out elusive signals. Twisted 300-ohm ribbon transmits signal from one-tube booster at top.



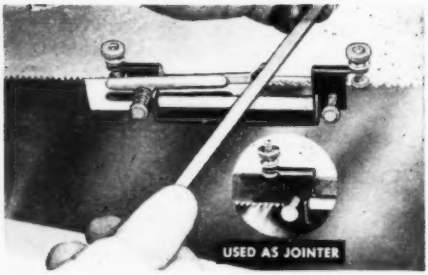
PHOTOS OF SCREEN prove Smith gets distance. Birmingham, Ala., station (left) is 750 miles away. Union Radio, Havana, Cuba (center) is 1,550 miles distant. "Local" stations like WKY-TV (right), only 225 miles off, come in regularly enough for programs to be enjoyed.

New Tools



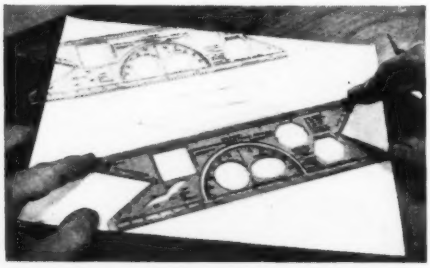
1 Thickness Gauge Has One Leaf. Although this gauge has only one leaf, it will measure from .002″ to .026″. In use, the tapered leaf (shown between electrodes of a spark plug) is slipped into the opening to be measured as far as it will go. Then the sliding pointer blade is moved until it touches the end of the gap being measured. The reading is taken at the other end of the pointer blade. The gauge is made of hardened steel.

2 Stirrer Holds Paintbrushes. Brushes can be suspended in paint or cleaning solvent with this gadget. It holds brushes above the bottom of the can, keeping the bristles straight. The clamp may be moved up or down the stirring stick to suit brushes of different sizes.

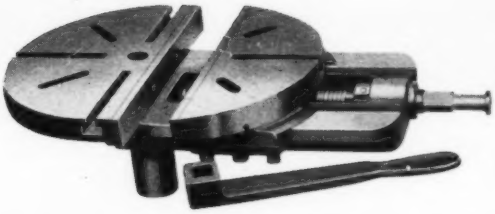


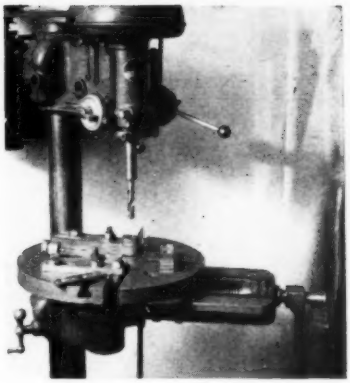
3 Jig Sharpens and Joints Saws. Set-screws hold this jig to the saw blade, and two steel rollers limit the depth of cut that is made with the file. The jig is equipped with a depth adjustment and a bevel guide. The guide keeps the file at the correct sharpening angle. With a mill file clamped in the jig, the tool can be used as a jointer to even up the tips of the teeth.

4 Gas Sprays Paint. Carbon dioxide cartridges, the kind you can buy in most drugstores to carbonate beverages, supply the pressure for this paint spray gun. A cartridge is loaded in the handle and the trigger meters the gas as needed. One cartridge will spray as much as 21 ounces of thin paints, correspondingly less of heavier liquids.

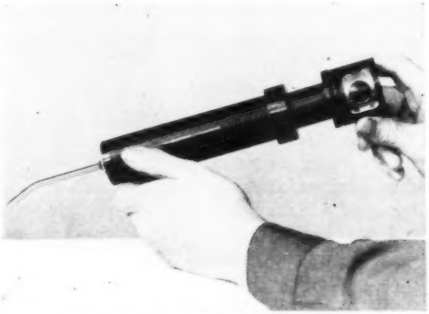


5 Fourteen Instruments in One. Made of noninflammable transparent plastic, this drawing tool combines a protractor, four rulers, guides for drawing eight common geometric shapes, and a guide for drawing circles up to 8″ in diameter. Arcs of various radiuses also can be made.



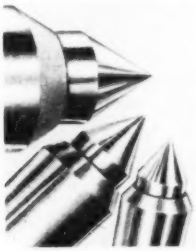


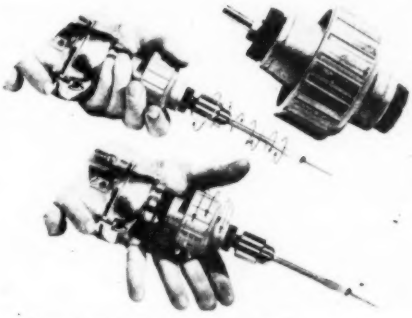
6 Vise Built into Drill-Press Table. Designed to replace a standard drill-press table, this combination model includes a vise and a set of parallels. Round stock can be held in the vise and other shapes can be bolted to the slots for a variety of setups.



7 Air Gun Operated by Hand. Chips, shavings and dust can be blown out of hard-to-get-at spots in machinery with this hand-powered air gun. An added feature is a flashlight built into the handle for inspections in badly lighted places. The Wind Mill is made of laminated phenolic plastic.

8 Lathe Centers Use Jet-Engine Alloy. Exmet, a new alloy developed to take the high speeds and temperatures of jet engines, now is being used to make dead centers for lathes. According to the makers, these centers have run for weeks without regrinding on jobs that normally require new high-speed steel centers after just a single day.





9 Hand Clutch for ¼″ Drill. Tools start and stop instantly with this 5-to-1 speed reducer. You just grip the reducer and the tool operates; release it and the tool stops and the reducer revolves freely. It has a planetary-gear system instead of a friction clutch, and the 5-to-1 reduction lets you drive screws, drill concrete and do other jobs that require high torque at low speed. It can be mounted on the spindle or in the chuck.

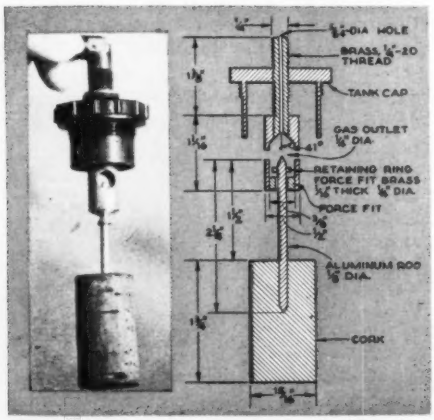
10 Nut and Screw Starter. A spring in the end of the shank holds a screw or nut until it can be started. After a few turns, the tool releases itself and pulls free. It has a Tenite plastic handle and comes in sizes to take nuts or screwheads from 3/16″ to 7/16″.

These tools are made by: 1. Rinck-McIlwaine, Inc., 16 Hudson St., NYC; 2. Progressive Enterprises, 5533 S. Western Avenue, Los Angeles 62; 3. A. D. McBurney, 317 E. 4th St., Los Angeles 13; 4. Sullivan-Becker Machine Co., 6705 14th Ave., Kenosha, Wis.; 5. Britain Products Co., 399 E. Exchange St., Akron; 6. Modern Machine Tool Co., Jackson, Mich.; 7. Air Line Mfg. Co., Box 18, Indianapolis; 8. DoAll Co., Des Plaines, Ill.; 9. Babcock & Co., 6253 Claremont Ave., Oakland 18, Calif.; 10. Kenneth D. Clayson, Box 1032, Bethlehem, Pa.

HEADING OUT TO SEA, twin-motored craft is sure of a safe return, since it can get back to port on one motor. Molded-plywood hull is 16′ long with 5′10″ beam. Weight is 450 lb.

Twin Motors Can Make Outboard Safer

A pair of power plants will cut down on the risks of deep-water fishing trips.



FLOAT VALVES maintain constant fuel level in motors' tanks. Corks float up or down to shut off or open valves in line from bow tank.

LET'S suppose you're fishing 20 miles off shore in a 16′ open boat. There's a husky outboard motor clamped on the transom, and suddenly it conks out. There's no hope of a baling-wire fix. You're stuck.

But if you have two medium-sized motors on the transom instead of a single husky one, you're in the clear. The remaining motor will see you home. This is why Dr. Van A. Odle is a twin-motor fan. When he and his wife leave their home on Balboa Island, Calif., for a 20- or 30-mile fishing trip on the Pacific, they have a pair of 10-hp. motors on their boat. When the weather looks right, they make jaunts that might be foolhardy in a single-engine craft.

Two Motors Pose Problems

Steering and throttle control of two motors from the wheel were two problems to solve. A third was fueling the motors on the open sea from a 21-gal. auxiliary tank.

The motors, unlike some of the newer models, are not equipped with fuel pumps to draw gas out of the auxiliary tank, so air pressure was used to force fuel back from the bow tank to the motors.

One drawback to this system is that it's very difficult to provide just the right amount of air. A couple of extra strokes on the pump will overflow the motor tanks, slopping gas over and fouling the motors.

Dr. Odle stopped this by building a float valve for each motor tank. He used the same gas-tank caps, but replaced the vent screws with homemade valves operated by cork floats. The corks cut off the supply of gas

STEERING LINES from wheel run to one motor. Other motor remains fixed, since only one is needed to steer boat. Details of twin-pulley arrangement for steering are shown below.

when the motor tanks are about half full.

Copper tubing leads from the auxiliary tank to the stern. Flexible neoprene tubing runs from the end of the copper line to the motors themselves. A homemade three-way valve directs fuel to either or both motors, making it possible to cruise with one motor tilted up (when its float valve would of course be inoperative).

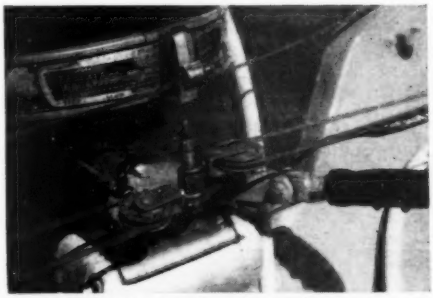
For simplicity Dr. Odle experimented with steering only one motor, leaving the other locked straight ahead. He found that one motor gave entirely adequate control. To retain the safety of having two independent power plants, he rigged the steering pulley so that it could be fastened to either motor's tiller.

The throttles are controlled by a continuous slack line that circles the inside of the cockpit. This arrangement has one drawback. Since just one motor pivots, the throttles are thrown out of synchronism during a sharp turn. This could be avoided by rigging independent throttle controls.

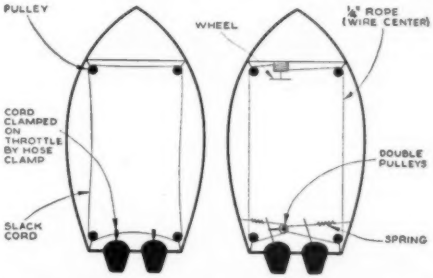
Two Motors vs. One

It is generally conceded that one big motor is more efficient than two smaller ones that total about the same power. But as Dr. Odle sees it, the safety factor offsets this.

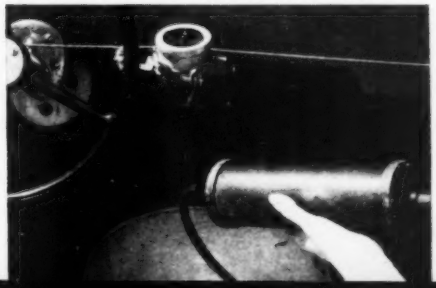
The efficiency loss may be largely theoretical in his case, at that. Much of the time choppy water makes speeds over 10 m.p.h. uncomfortable, so he cuts one motor and tilts it up out of water. When sea conditions permit, both are operated, giving a top speed of about 23 m.p.h. . END



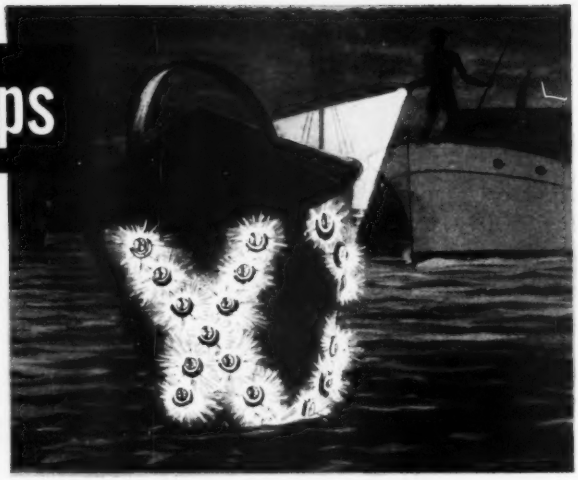
CONTROL LINES for throttles and steering are shown above and diagramed below. Line is attached to throttles with hose clamps.



AIR PRESSURE for bow tank is supplied by hand pump below. Three or four strokes on pump every 30 minutes maintain air pressure.

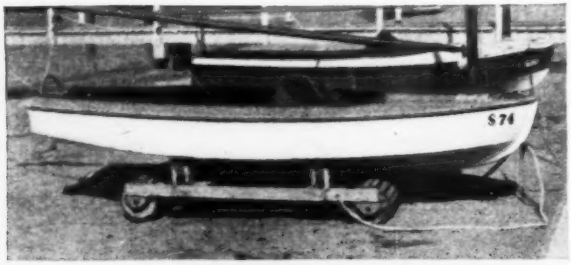


Boating Tips

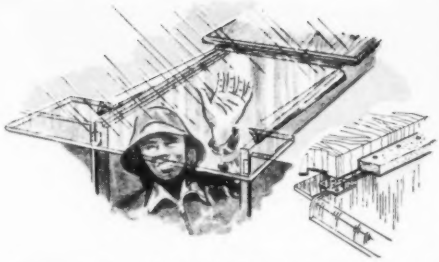


Reflectors Spot Buoy. You'll be able to pick up your buoy even at night in a crowded harbor if you cement glass reflector "jewels" to it in a distinctive pattern. The pattern will leap out of the darkness as the beam of your spotlight sweeps it.

How to Store Boat-Carrier Suction Cups. When the vacuum cups of an auto-top boat carrier are not in use, wrap them loosely in newspaper and store them in a cool, shaded place. If the cup surfaces become slightly hardened, sand them lightly with a fine abrasive paper or cloth. Then wipe them with castor oil. Wipe off the oil before using them.



Beach Dolly Rolls on Sand. Launching or beaching a boat is a snap with a dolly like this. The wide rollers, made of one-by-twos nailed to 2″ by 12″ wood disks, won't sink into the sand like trailer wheels. The side members are two-by-sixes with a one-by-four cross brace. The cradle supports are made of one-by-six stock, and the cradles are two-by-sixes pivoted on ½″ galvanized bolts. Pivoting the cradles lets them conform to the hull, distributing the load evenly and permitting the dolly to carry different boats. *—C. R. Hull, Costa Mesa, Calif.*



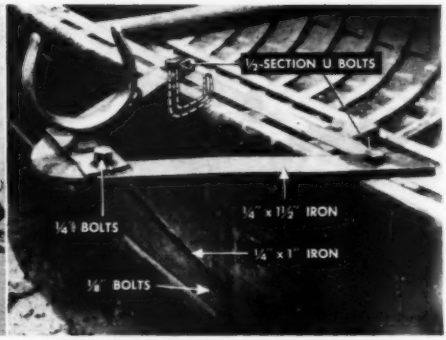
Plastic Skylight Lights Cabin. Rainy weather means battened hatches and dark, stuffy cabins. Sawed from ¼″ Lucite or Plexiglas, this skylight can be slid in place to let in light, and its projecting lip allows the door to be left open for air.

Steering Arm Quickly Removed. I only have to unscrew two thumb nuts to remove the steering arm when I want to carry my outboard motor in the car trunk. I drilled and tapped two 5/16″ holes through the web of the motor housing and inserted 5/16″ by 1¼″ brass machine screws. Matching holes were drilled in the steering arm. To keep from losing the washers, I soldered them to the wing nuts. *—Clinton R. Hull, Costa Mesa, Calif.*

Boat Stored Under Garage Roof. With two sets of block and tackle, four iron hooks and some ½″ line, you can store a small boat under the roof in many garages. Bend the hooks from ½″ iron rod and wrap them with cloth so they won't mar the boat's finish. When you are ready to haul the boat up, space the hooks so that the two pairs divide the hull into thirds. This method of storage is especially handy if the boat is carried on top of a car.

Safety Pins for Rowlocks. Heavy galvanized or copper wire or ⅛″ bronze brazing rod can be bent to form safety pins for rowlocks. Such pins will keep the rowlocks from accidentally lifting out of the sockets.

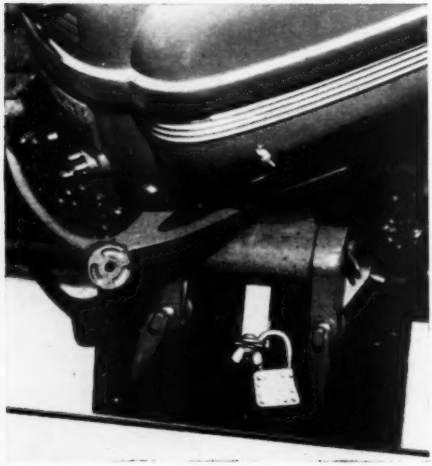
Boat Table for Rough Weather. The recessed box built into this table has removable partitions that form various-size compartments. These hold utensils and food containers upright in heavy seas. A solid panel fits over the recess to reconvert it into a standard table.—*W. F. Buehr, N.Y.C.*

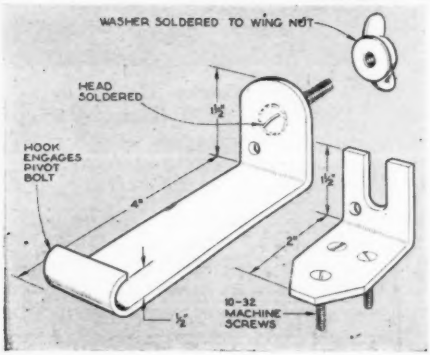


Outrigger Oars Increase Canoe's Speed and Maneuverability

EQUIPPING a canoe with outriggers and oars not only lets you make higher speed than you can by paddling, but also gives better control in strong winds. Locate the outriggers so that the rower will sit a little astern of the middle of the craft.

The ¼" by 1" support for each outrigger should be located to make the ⅛" bolt pass through one of the canoe's ribs and should meet the hull above the water line. Use heat to bend the outriggers and the U bolts.—*Emery G. Gregory, Reedsburg, Wis.*





Guard Locks Outboard Motor

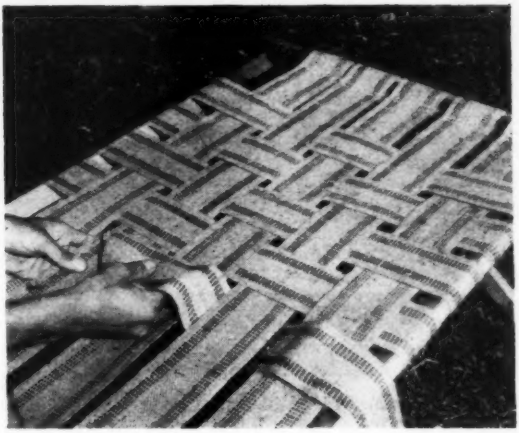
WITH this clamp-on guard, an outboard motor can't jump off the transom. It consists of two main parts: a hooked piece that fits over the bar on which the motor tilts, and a bracket mounted on the transom. A wing nut and bolt hold the two parts together, and a padlock by the nut discourages motor thieves.

Bend the two parts of the hold-down from 3/32" galvanized sheet iron. Use a hacksaw and file to slot the hooked part. Drill holes for the bolts, and also holes to suit the shackle of the padlock.

To mount the hold-down, put the motor on the transom and tighten the motor's mounting screws. Engage the hook on the tilt bar and locate the position of the bracket. Allow ⅛" clearance between the two parts for tension when the wing nut is tightened. On some transoms a spacer block may be needed under the bracket.

To use the safety clamp, set the motor in position with the hook over the pivot bar and tighten the wing nut. Then tighten the motor's mounting screws.—*Clinton R. Hull, Costa Mesa, Calif.*

Webbing Strips Replace Canvas on Old Folding Camp Cot



IF THE canvas is ripped or stretched on that old camp cot but the frame is still good, it's worth recovering. Upholsterer's webbing used in place of canvas makes a rugged, good-looking camp bed.

You will need about 24 yards of webbing, some tacks, a darning needle and tough string or fishing line. Remove the old canvas, stretch a piece of webbing the full length of the cot and stitch loose loops around the end bars. Double each end of the fabric so the darning string goes through three thicknesses.

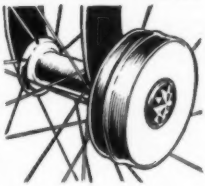
Sew in five such lengthwise strips and then weave cross strips under and over them. Double the ends and tack them under the frame sides where you can. Where tacked webbing would interfere with folding parts, use shorter cross strips and stitch them to the lengthwise ones.

The renovating job won't cost you much. I bought upholsterer's webbing for 13 cents a yard.—*Warren Asa, Pana, Ill.*

Soap Cupboard Built in Wall

HERE's an easy way to store soap powder right next to the sink. The cupboard simply utilizes the space between two studs. Cut the opening high enough to take a giant-size box of soap flakes and nail two cleats to the studs at the bottom of the opening to hold a shelf. You can make the door of plywood or tongue-and-groove stock cleated together. A catch and knob complete the job. I didn't use a knob since this door fits flush with a window sill at the top.—*Jerry Parker, Sonoma, Calif.*

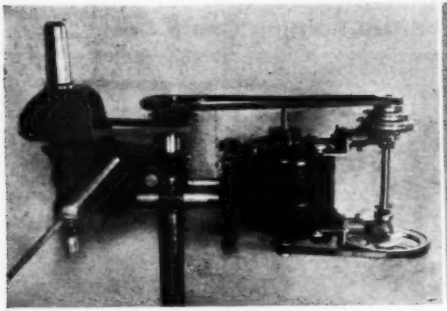
Bike Hub Caps Made from Cans

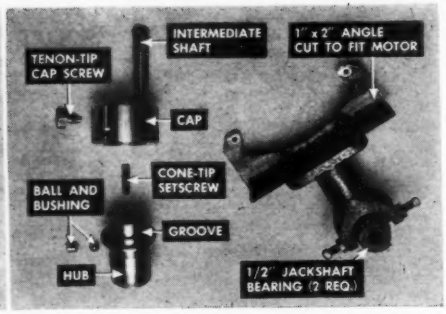


A BICYCLE can be dressed up to the juvenile eye with hub caps made from empty shoe-polish cans. Punch a ⅜" hole in the bottom half of the can to fit it over the axle, and use the axle nut to clamp it in place. Punch a centered hole in the can lid to take a jeweled reflector or ornamented license-mounting bolt. Press the lid back on and coat the can with aluminum paint.

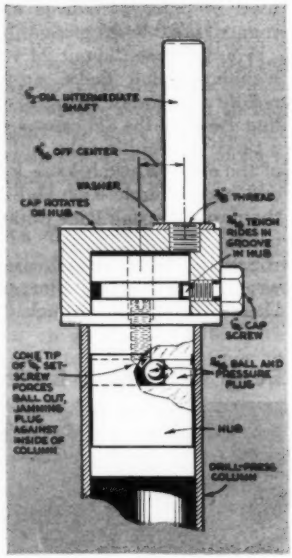
Lock for Barn Stalls Is Safe

THIS lock for stalls, used in the Mullins barn, North Lima, Ohio, can't be jarred open by accident. An ordinary barrel-type door bolt mounted vertically above a lock hasp does the trick. To lock, the slotted leaf is passed over the eye of the hasp. The bolt then is dropped down into the eye.—*John Krill, North Lima, Ohio.*





New Shop Ideas



Drill-Press Speed Changer. The experimenter, drilling one job at high speeds with Nos. 61 to 80 drills and the next with a slow-turning circle cutter, will find this wide-range speed changer an asset to the drill press.

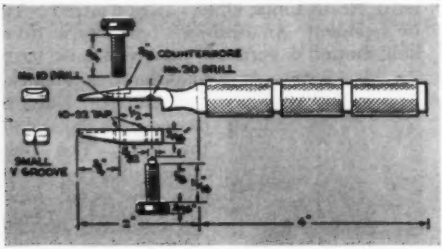
Power is transmitted from a 2" pulley on the lower motor shaft to a 6" pulley on the jackshaft. A 4" four-step cone pulley atop the jackshaft is belted to a similar pulley on the intermediate shaft. This shaft "floats" on a swivel cap mounted on a hub turned to fit in the drill-press column (right above). This arrangement will give a speed range of 86 r.p.m. to 2,300 r.p.m. using a 1,725-r.p.m. motor. Vary the single pulleys for other speeds.

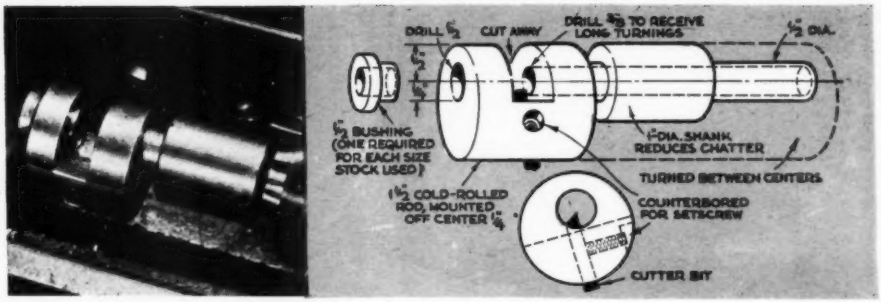
The hub and floating cap are turned from cold-rolled steel (right). The cap swivels freely and is held in place by a tenon-tipped cap screw which rides in a groove in the hub.

The jackshaft bearings are mounted on the motor with steel angles cut and drilled to fit. Replace two of the motor-housing bolts with longer threaded rods and lock nuts to fasten the angles in place.—*A. L. Sprecker, Freeport, N. Y.*

Pin Vise Has Parallel Jaws. Resembling a machinist's parallel clamp with a handle added, this pin vise is a useful addition to the modelmaker's toolbox.

Turn the handle and one jaw from a 6" length of 9/16" cold-rolled steel. Knurl the handle and drill it out to lighten it. File the jaw to shape and fit a matching jaw, cut from 3/16" flat stock, to it. Drill and counterbore the stationary jaw, and tap the adjustable jaw for the No. 10-32 thumbscrews, turned from 9/16" rod. Lock both jaws together with the thumbscrews and file them to a perfect match. File a narrow V groove in one jaw to grip pins or thin stock.—*R. H. Dalton, Roseville, Mich.*



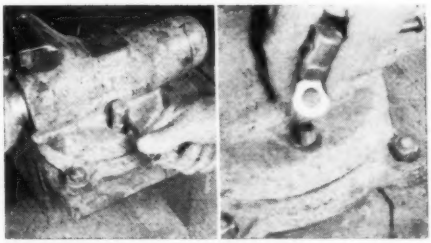


Hollow Mill Turns Screw Blanks. Especially useful when turning out a quantity of screws, this one-piece hollow end mill saves miking the shanks and frees the compound tool holder for cutting off.

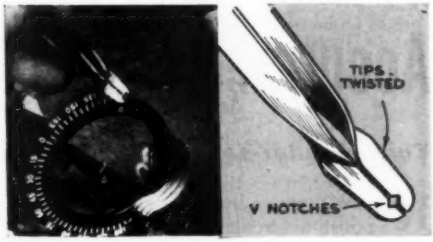
Turn it from a piece of 1½″ cold-rolled steel rod, about 4½″ long, mounted ¼″ off center. After forming the body, chuck the ½″ shank in the headstock chuck and drill a ½″ hole about ¾″ deep for the bushings. Follow with a ⅜″ drill completely through the body to give clearance for long turnings.

Mill or cut away a portion of the head as illustrated and drill a 5/16″ hole for the ¼″ cutter bit. Enlarge the hole by filing square corners to fit the cutter. Drill and tap for an Allen setscrew at 90° to the bit.

Turn a number of ½″ bushings and drill them as you need them for various sizes of rod stock.—*F. McGuckin, Ridgewood, N. J.*



Washer Adjusts Vise Lock. If the locking handle on your swivel-base vise projects over the end of the bench when tightened, try inserting steel washers of various thicknesses under the collar. Experiment until you find one that changes the thread position enough to make the handle lie close to the vise when tightened.—*Keith Heryford, Cedarville, Calif.*



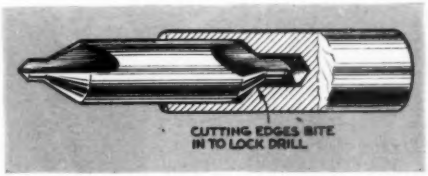
Tweezers Improved. An ordinary pair of tweezers can be altered to become an almost indispensable tool for delicate assembly work.

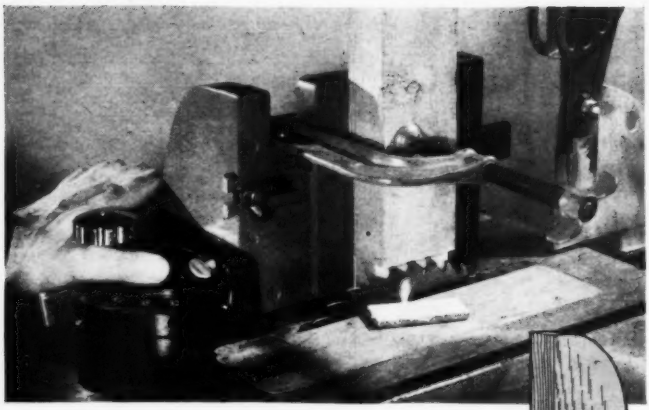
Anneal the tips by heating, and twist them so that the two edges butt together. File a small V in each tip to grip the thin shanks of tiny screws while starting them in their threads.

Quick Centerdrill Extension. Soldering drills to extension rods is an old dodge, but it takes time. Here is a simple way to extend a centerdrill, without soldering, to reach into out-of-the-way places.

Select a rod about ⅛″ larger than the diameter of the centerdrill body and drill a hole slightly larger than the centerdrill tip. Counterbore this hole to receive half the length of the drill body.

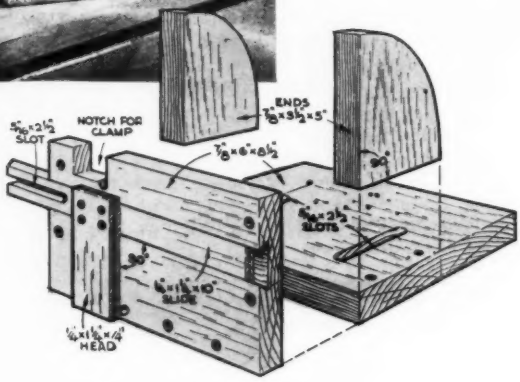
When the centerdrill is inserted and starts cutting, the flutes of the nonworking end will bite into the smaller hole, locking it against twisting. A counter twist to the left releases the drill for removal.—*L. E. Fannon, Huntington Park, Calif.*





TRUE CUTS that make the cheeks parallel to the face are a matter of course with this jig. The work is clamped and can't teeter. Although guard must be swung out of the way, operation is safe because fingers come nowhere near the blade.

Homemade Jig Cuts Tenons Accurately

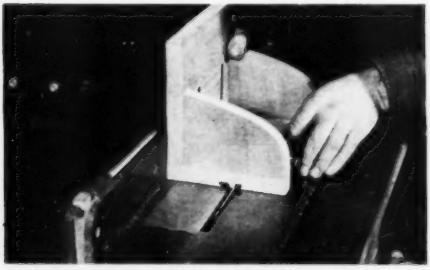


This circular-saw gadget puts a stop to juggling upended work.

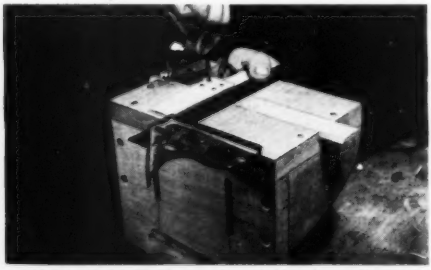
RIPPING tenons by holding stock upright against a circular-saw fence is touchy business. The thrust of the saw-teeth always tends to throw the naturally unstable work out of line.

But with this jig, cutting tenons or half laps on long pieces is a cinch. It will take stock up to 2½" thick. The adjustable slide permits centering any size of work directly under the foot of the clamp for a secure grip. Clamping is easy because the clamp itself is permanently attached.

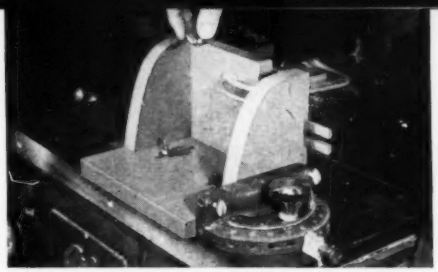
With two blades spaced apart the thickness of the tenon, you can cut both the cheeks at one pass, a real advantage on duplicate work. By attaching a notched



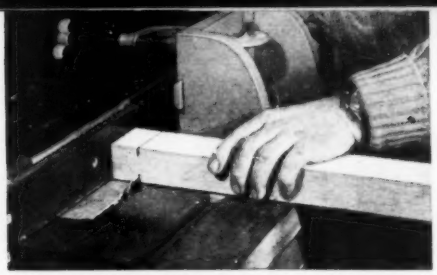
CUT DOVETAIL GROOVE in the face like this. It should be slightly farther from base of jig than maximum height saw can project above table. Tilt saw or table 30° to rip each side. Remove waste with successive passes.



ATTACH CROSSPIECE, or head, to the slide with four wood screws, aligning it with square as above. Slide is notched at far end to pass clamping stud, which is a 5/16" bolt threaded into a ¼" hole in the face and cut short.



MOUNT THE JIG on the miter gauge with two 5/16″ flathead bolts and wing nuts. The bolts go through the base slots and two holes drilled in the bar of the miter gauge. Butt jig firmly against the head of the gauge.



CUT TENON SHOULDERS FIRST, holding work against front end of jig as above. Use fence as stop gauge. Flip over to cut second shoulder. Then clamp stock upright in jig, as in top photo on facing page, to rip cheeks.

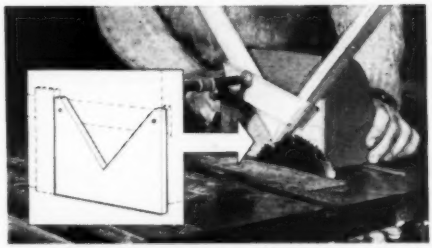
piece of plywood to the slide, you can hold mitered members to groove the joint for a spline.

Check the dimensions against the size of your own saw. The jig shown is for an 8″ machine. Cut the main parts from ⅞″ maple, oak or birch. Lay out the base slots so that, with bolts through them into the miter-gauge bar, the face of the jig can be adjusted from within ¼″ to 2½″ of the saw blade. Jigsaw the slots.

Drill two 5/16″ holes in the bar to suit the slot spacing. Countersink them from beneath for flathead bolts.

Assemble the base, face piece and two ends of the jig with glue and deeply countersunk wood screws. Be sure the ends are precisely square with the face.

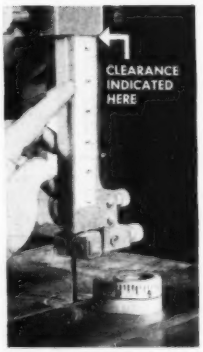
Rip the ¼″deep dovetail groove just above maximum saw height, so that the blade can't hit the slide clamping nut. Notch the face above the slide for a 4″ C clamp. Then cut the slide to fit the groove and attach the head, as shown in the photos.



SPLINE GROOVES in mitered joints are made with parts clamped in a 90° notch cut in a piece of ¼″ plywood. This is attached to the dovetail slide with two screws. Block under clamp secures both parts of work.

Secure the clamp with a wood screw run into the bottom of the notch. Finish the jig with shellac, lacquer or enamel.—*Herbert Pfister, The Bronx, N. Y.*

Tape Shows Bandsaw Clearance



It's awkward to get a heavy, overhanging piece of work up on the bandsaw table and then find it won't go under the blade guide. A piece of measuring tape fastened to the sliding guard, as at left, will show against some stationary point (the bottom of the wheel guard in this case) actual clearance above the table. Thus it can be set beforehand.

The tape shown is self-adhering, but sewing tape can be cemented on, or steel tape riveted in place.

They're mechanics at an Air Force Base. Sky scanner is slang for radar. A boogie is an unidentified aircraft and a gooney bird is a C-47 transport plane.

How to Choose Plugs for Household Appliances

The right ones will last longer and prevent fires, shocks and shorts.

IF YOU are a plug snatcher—borrowing one from a lamp to put a toaster back in business—you are shortchanging your appliances. Electric plugs aren't all alike.

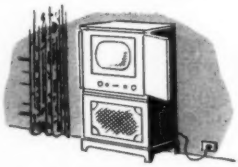
Though many plugs will work interchangeably, there is a preferred type for every job. Some are made to stand frequent plugging and unplugging, some to carry heavy current, some to bounce back when they are dropped or stepped on. There are plugs that lock into sockets and others that fit only one way so the "hot" and grounded sides of the AC line can't get crossed.

Next time you replace a fixture plug, use the right one the right way. Always leave a margin of safety by wiring appliances to take abuse—then not abusing them.—*Carlton Strickland, Roanoke, Va.*

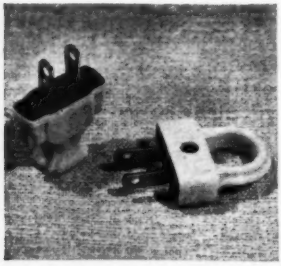
TYPES OF PLUGS

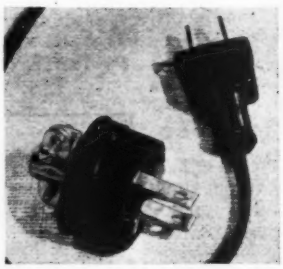
GRIP PLUGS having shanks or finger loops are first choice for light-duty appliances that must be plugged and unplugged frequently.

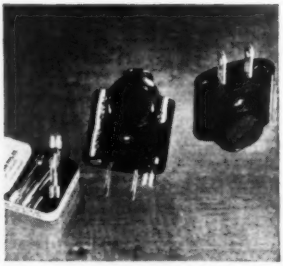
RUBBER PLUGS take heavy handling in their stride, should be used in shop, kitchen. Clamp (left below) makes sure wire won't pull loose.



FUSED PLUGS with low-amperage auto-type fuses give appliances extra protection, let house lights stay on if trouble develops.

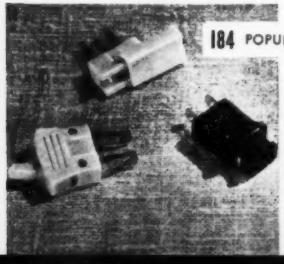




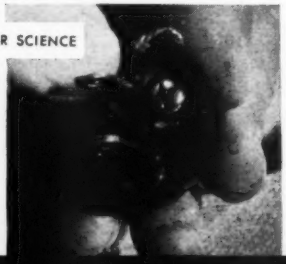


HOW TO WIRE A PLUG

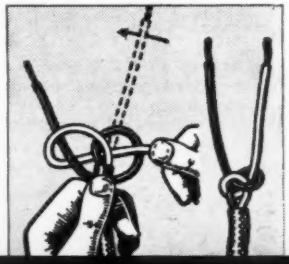
NEW PLUGS connect themselves to flat, two-conductor wire. You just insert wire in hole or slot and slide plug sections together—no tools, no wire stripping. This type is meant for light duty only.

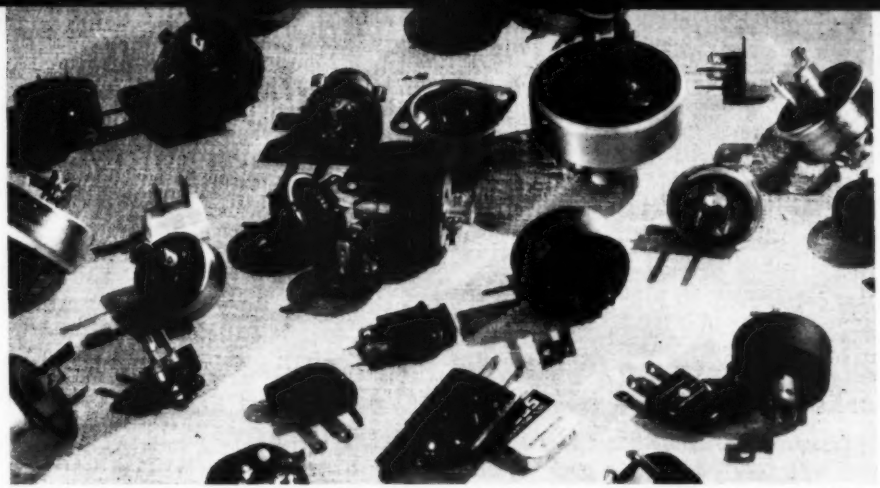


WITH SCREW-CONNECTED PLUGS, you must first bare tip of wire and twist strands so they stay together. Loop each lead *around* prong and hook wire tip *clockwise* so screw won't back wire out.



UNDERWRITERS' KNOT relieves pull on wire. Tied this way, knot wedges in plug neck, keeps pull from loosening connections. Ordinary knot may tighten unevenly, let contacts pull loose.

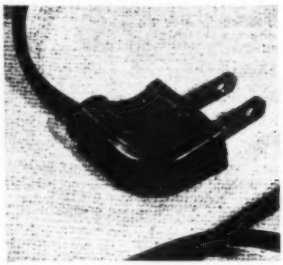


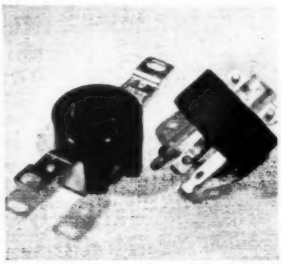


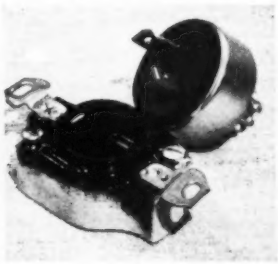
Proof that electric plugs aren't all alike. Here are a few of the many styles and sizes available.

SIDE-ENTRY PLUG fits narrow space behind chest or bookcase. It saves floor space, and abrasion from furniture can't fray or damage wire.

POLARIZED PLUGS, which fit their special sockets only one way, are a safety requirement for equipment like power tools and washing machines. Properly installed, one prong grounds machine frame. This prevents shocks—especially dangerous in cellars—if a short should make frame "hot."





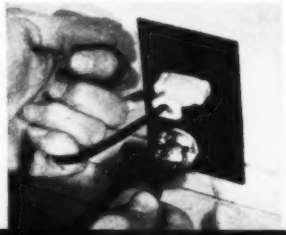


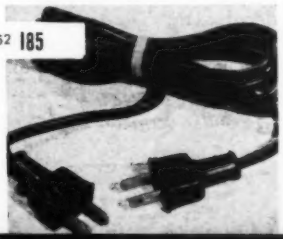
PLUG DON'TS

DON'T YANK THE WIRE. You'll probably have to keep after the wife and kiddies to eliminate this cause of broken wires and loose connections, which can be a nuisance, lead to shorts, shocks and fires.

DON'T USE BRITTLE PLUGS where they may be dropped or stepped on. Rubber plugs stand more abuse, are better for shop and kitchen appliances. Heavy plugs are okay for light appliances.

DON'T DOUBLE-END A WIRE. One of these plugs would be dangerous if the other were inserted in a socket. When making extensions, pair plugs and sockets only. Free plugs should never be hot.



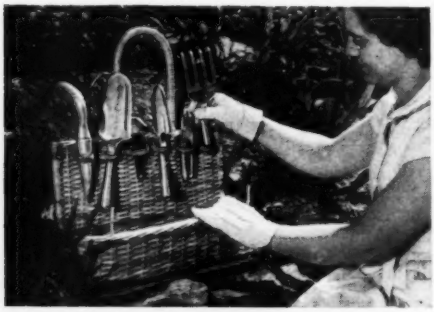


Cam-Operated Lawn Trimmer Cuts as You Push It Along

TRIMMING along the edges of a lawn is easy with this tool. As you push it along, cams on the wheels actuate a cam follower on each side. The followers in turn oscillate the upper cutter blade of the miniature sickle bar. The bottom view of the Bolens Trim-Master (right above) shows the cams and one of the followers. The aluminum wheel has a rubber tread. *Food Machinery and Chemical Corp., Port Washington, Wis.*

Sprinkler Looks Like Flower

CIRCLES up to 40′ in diameter can be sprayed with this plastic lawn sprinkler that looks like a blossom in a flowerpot. Water pressure revolves the tube and flower. A rustproof metal spike is jammed in the ground to hold the sprinkler upright. *Emenee Industries, Inc., 200 Fifth Ave., New York City.*



Tools Fit in Garden Basket

SIX garden tools, a rubber kneeling pad and gloves can be carried in this fitted garden basket. The tools are a dibbler, knife, trowel, fork, transplanter and shears. *Hammacher Schlemmer, 145 E. 57th St., New York City.*

Pruning Tool Picks Flowers

THIS 18″ aluminum pruning tool reaches high places or through branches to snip off a flower and hold it by the stem while you retrieve it. Squeezing a lever on the handle operates the blade, which can be removed for sharpening. *J. Wiss & Sons, Newark, N.J.*

Hose Nozzle Mixes Plant Spray

THE venturi action of this nozzle sucks liquids—weed killer, fertilizer, insecticide—from a bucket and mixes them with water from a garden hose. Liquid is drawn from the bucket through a 3′ suction hose. Detergent also can be sucked up and the spray-mix nozzle used to wash cars, windows or siding. *Melnor Metal Products Co., 112 Lafayette St., New York City.*

JULY TO DECEMBER, 1951 • VOLUME 159 • NOS. 1 TO 6
POPULAR SCIENCE MONTHLY

Mechanics and Handicraft INDEX

Items in heavy type are page or more in length

A

Abrasive wheels, protecting.....Dec. 215
Acheson, Dean, builds cabinet....Nov. 205
Appraising a house.....Sept. 166
Asbestos soldering pad.....Aug. 201
Attic fan, installing.....July 191

AUTOMOBILES

Buying a paint job.....Aug. 154
Car starters, new.....Dec. 194
Dream engine.....Nov. 193
Hints from the Model Garage July 145, Aug. 161, Sept. 185, Oct. 199, Nov. 199, Dec. 199
Hydraulic trailer brakes...Dec. 195
Kerosene-fed cars.....Dec. 193
One-lung racer.....Aug. 165
Rusty gets new coat.....Aug. 156
Souping engines.....Dec. 189
Undercoating your car.....Oct. 193
Why drive rattletrap?.....Oct. 188

ACCESSORIES

Accessories for car.....Sept. 176
Car-top polisher.....Sept. 178
Dipstick wiper.....Aug. 163
Engine warmer.....Sept. 176
Extra lights for car.....July 149
Funnel reaches fuel tank.....Sept. 186
Glove drier.....Sept. 178
Heater tips.....Dec. 188
Hill holder rests foot.....Sept. 176
Jack mounted on trunk lid.....Nov. 194
Oil-condition gauge.....Dec. 200
Pencil eraser foils thieves.....Sept. 178
Tailpipe-extension lining.....July 153
Trouble lamp easily made.....July 145

AIDS FOR DRIVERS

Air screen guards generator.....July 153
Case holds meter changs.....Aug. 162
Garage target spaces cars.....Nov. 199
Glove compartment unloader..Aug. 161
Open cowl vent stops dust.....July 153
Shingles improve traction.....Dec. 256
Soldered keys easy to spot.....July 153
Starting car in winter.....Nov. 189
Storage space behind grille....Nov. 194
Wheel-cover gripper.....Sept. 185
Winter driving aids.....Oct. 192

BODY CARE

Antifreeze can mar finish.....Nov. 194
Body paint, protecting.....Aug. 155
Bumper bolts, tightening.....Oct. 200
Chrome, how to protect.....Aug. 162
Diagonal-parking protection..Sept. 179
Exhaust extension.....Sept. 179
Fabric cleaners.....July 148
Fender line, calking.....Oct. 195
Fender welt replacement.....Sept. 178
Frozen locks, preventing.....Nov. 195
Garage bumper saves fenders..Sept. 179
Hood latch, oiling.....Sept. 186
Hose nozzle, cover for.....Oct. 200
License-plate rattles, preventing July 147
Lock button, freeing.....Sept. 185
Protecting your car's body Sept. 179
Rattles, how to quiet.....Oct. 188
Rugs keep car floor clean.....July 145
Seal car for winter.....Sept. 180
Shield stops flying stones.....Dec. 199
Touch-up paint record.....July 147
Undercoating prevents rust....Sept. 179
Undercoating your car.....Oct. 193
Undercoat spatter, removing....Aug. 163
Weather strip, replacing.....Oct. 200

ENGINE CARE

Antifreeze, protecting.....Nov. 195
Distributor-point dressing.....Aug. 157
Muffler, oil quiets.....Dec. 200
Oil filter, anchoring.....July 146
Oil holes, cleaning.....July 145
Oiling tight spots.....Sept. 186
Oil measured by file marks.....Oct. 199
Radiator heat retainer.....Nov. 195
Transmission, keeping clean....Dec. 199

ROADSIDE EMERGENCIES

Battery juice, borrowing.....Aug. 164
Carburetor, priming.....Aug. 164
Fan belt, temporary.....Aug. 164
Fuel-line leak repair.....Aug. 164
Fuse replacement.....July 152
Gas-tank leak repair.....July 152
Tire changing without jack.....July 152
Vapor lock.....July 152
Water carried in hub cap.....July 152

SERVICING

Auto-radio servicing.....Nov. 216
Battery cable, loosening.....July 145
Choke strainer, cleaning.....Aug. 163
Creeper hauls batteries.....Nov. 200
Cylinder head, loosening.....Oct. 199
Defroster-blade tip.....Nov. 195
Flashlight lights jack.....Aug. 162
Fuel-gauge unit, testing.....Oct. 199
Gasoline, keeping clean.....Oct. 199
Hot pad for under-car work...Aug. 161
Head-nut wrench.....Oct. 200
Hydraulic brakes, bleeding.....Dec. 200
Hydraulic lifters, cleaning....Nov. 200
Ironing pad handy in a car....Oct. 191
Lift height guided by chain....Sept. 186
Mat clip leaves hands free.....Nov. 200
Oil pan, replacing.....Aug. 161
Rattles, locating.....Oct. 187
Shock plugs, removing.....Aug. 162
Spare coil saves towing.....July 146
Spark plugs, deep-well.....Oct. 191
Starter-spring replacement.....Aug. 163
Tie-rod ends, greasing.....July 147
Tie-rod ends, replacing.....Dec. 199
Valve guides, removing.....Nov. 200
Valve keys, removing.....July 146
Wiring harness, installing.....July 147

WHEELS AND TIRES

Brake spring, replacing.....Sept. 185
Brakes, quieting.....Oct. 195
Disks over wheel weights.....Nov. 199
Gun shoots patch into tubes...Oct. 191
High-pressure leak, locating..Sept. 178
Inner tube, patching.....July 137
Static springs, lubricating.....Nov. 199
Truck tube freed by vacuum....Sept. 185

B

Bandsaw, judging.....Oct. 204
Bandsaw subs for lathe.....Nov. 228
Barber-chair base in shop.....Dec. 229
Bargains from a house wrecker.....Nov. 230
Battery cable, loosening.....July 145
Battery-lead extensions.....Aug. 181
Battery life, extending.....Sept. 203
Bedside tray, support for.....Aug. 175
Bell clears path for sled.....Dec. 212

BOATS AND BOATING

Bilge pump made of pipe.....Aug. 207
Boat built from PSM plan.....Nov. 205
Canvasing a boat deck.....Aug. 174
Collars moor boats.....July 160
Hanger for fishing plugs.....Aug. 210
Metal molding protects boat....Aug. 210
Mooring boats in small area....Aug. 152
Paddle easily made.....July 188
Radio control for models....Aug. 202
Sailboat storage hints.....Sept. 196
Spark booster.....Aug. 173
Tire chains make ladder.....Aug. 176
Trolling plate.....July 172
Weight secures boat.....Aug. 210

Bolts, unfreezing.....July 141
Bookcase has newspaper shelf.....July 171
Bowl, craftsman carves.....Oct. 221
Building-paper roller.....Dec. 180

C

Cabinet handles made on lathe..July 136
Cabinet slides are curtain rods....Aug. 153
Calking house leaks.....Oct. 178
Cameras: see Photography
Camping skillet, handle for.....Aug. 207
Camp stove burns solid fuel.....Oct. 242
Candles, electric.....Dec. 212
Candlesticks, miniature.....Dec. 218
Canvasing a boat deck.....Aug. 174
Carnival for dolls.....Dec. 233
Cart made from baby carriage...Oct. 268
Cats, photographing.....Dec. 206
Chemical dries room.....Aug. 177
Christmas-card rack.....Dec. 211
Christmas ornaments, storing.....Dec. 237
Christmas-tree stand, outdoor...Dec. 237
Christmas tree, tailoring.....Dec. 201
Cigarette dispenser.....Dec. 211
Circumference divider.....Aug. 234
Clamp setup for shop.....Aug. 201
Clamp works two ways.....Oct. 229
Clock, silencing loud tick.....Aug. 199
Clothes drier in radiator cover Oct. 238
Clothespin grips dowel.....Nov. 238
Coins, protecting new.....July 188
Cold-light enlarger.....Sept. 197
Concrete-block garage, how to build.....Aug. 145, Sept. 218
Concrete incinerator, making....Sept. 226
Concrete, mixing.....Aug. 151

CRAFTWORK

Antique spice box.....Sept. 202
Carving a pipe.....Dec. 185
Cigarettes rise with lid.....Dec. 211
Craftsman carves bowl.....Oct. 221
Fire screen.....Oct. 184
Food warmer.....Nov. 212
Jewelry made on lathe.....Dec. 219
Jug lamp.....Dec. 210
Lamp made three ways.....Aug. 185
Nautical tray.....Nov. 213
Sewing cabinet.....Nov. 187
Stirrup lamp.....Sept. 187
Wooden bowl is tied together..Dec. 184

Curtain rods, uses for.....Aug. 153
Cut-glass, cleaning.....Sept. 225
Cut-out signs, making.....July 182

D

Damp room, drying.....Aug. 177
Decals on outdoor signs.....July 183
Demagnetizer from clock coil...Aug. 234
Desk built of flooring.....Dec. 233
Diesel, model.....Nov. 205
Disks cut on circular saws.....July 160
Dividers, how to make.....Oct. 276
Dog photos, how to take....Sept. 207
Doll-house furniture.....Dec. 214
Door joint, bolt reinforces.....Aug. 152
Drawer pull, braided leather....Sept. 203
Dressing saw teeth.....Aug. 172

DRILLS AND DRILLING

Depth setting, one-hand.....Oct. 229
Drills and drilling.....Dec. 221
Drills as feeler gauges.....July 185
Emergency drills.....July 172
High-speed press, making..Dec. 225
Jig sets overlapping holes.....Nov. 229
Rack from harmonica.....Oct. 217
Rack from tape spool.....Aug. 200
Radial drilling on lathe.....Aug. 200
Speed reducer.....July 185
Used drill press, judging...Oct. 201

E

Easel cleans for new picture.....Nov. 238
Electrician's screwdriver.....Nov. 181
Enamel, cleaning rust from.....Oct. 266
Engine has condenser.....Sept. 193

Engine to dream about.....**Nov. 193**
Enlarger, cold-light.....**Sept. 197**
Exhaust-stack flap keeps rain out..Aug. 157

EXPERIMENTS

Heat that travels like light Oct. 230
Kitchen mixer answers questions Aug. 178
Motor oils.....**Sept. 211**
Silicones in your home.....**Nov. 221**
What keeps refrigerators frigid?.....**July 162**

Eye changes shape to focus.....Oct. 302

F

Fabric cleaners.....**July 148**
Feed scoop from saucepan.....Sept. 196
Feeler gauge, using drill as.....July 185
File handle from scrub brush.....Oct. 276
Fireplace needs no masonry.....Oct. 185
Fire screen, building.....**Oct. 184**
First-aid items, storing.....Sept. 230
Fishing plugs, hanger for.....Aug. 210
Flag holder from barrel bolt.....Aug. 238
Flashlight holder.....Aug. 163
Flashlight lights lock.....Aug. 152
Floor sag, removing.....**Dec. 202**
Floor squeaks stopped by nails..Nov. 266
Flowerpot from phono record....Sept. 203
Flush valve replaced by bulb.....Aug. 186
Flying machine, 1914 style.....Dec. 233
Fog lamps, installing.....**July 151**
Folding chair for grandstand..Aug. 196
Food leftovers, storing.....Sept. 225
Food warmer.....**Nov. 212**
Footstool snack tray.....**Aug. 198**
Freezer-tape dispenser.....Sept. 225
Frozen pipes, thawing.....**Dec. 234**
Fruit-juice cans, using.....**Nov. 220**

FURNITURE

Bookcase holds newspapers.....July 171
Cabinet uses narrow wood.....Aug. 238
Carved stool.....**Nov. 185**
Colored stains show grain..Dec. 177
Desk built of flooring.....Dec. 233
Footstool snack tray.....**Aug. 198**
Furniture arranged on plan....Nov. 181
Radiator cover hides drier..Oct. 238
Toy chest, shelves.....**Dec. 216**

G

Garage, concrete-block, how to build.....**Aug. 145, Sept. 218**

GARDENS AND GARDENING

Grip improves grass cutter.....July 189
Mower trims edges.....**July 179**
Tree stumps, burning.....Dec. 180
Tree stumps sawed flush.....Nov. 214
Walking sprinkler.....**July 186**

Gas connections, testing.....July 160
Gas mule totes hiker's pack.....Sept. 224
Gift wrapping.....**Dec. 205**
Glasses case holds pencils.....Dec. 218
Glass-setting tool.....Aug. 199
Glider model drops motor...Aug. 188
Glove grip, improving.....July 136
Gloves clipped to coveralls.....Oct. 217
Gluing clamp is like sawhorse....Nov. 214
Goat cart.....Sept. 193
Gouging-depth markers.....Sept. 215
Grain shows through colored stains.....**Dec. 177**
Grandstand chair folds.....**Aug. 196**
Grass cutter, hand grip for.....July 189
Grease cups, odd jobs for.....Dec. 228
Green lumber, how to use...Nov. 177
Grinder drives shaper.....**Sept. 210**
Grinding in the lathe.....Sept. 216
Gun reloader in car trunk.....Nov. 214

GUS

—and the missing truck.....Oct. 196
—and the 10-mile car.....Sept. 182
—answers a night call.....Aug. 158
—cracks the ice for Santa..Dec. 197
—gives Air Force a lift.....Nov. 197
—is saved by a straw.....July 143

Gyro, musical note controls.....Oct. 266

H

Hammer avoids scratches.....July 171
Hammer holds nail lubricant.....Dec. 215
Handle, braided leather.....Sept. 203
Handle for graduate glass.....July 181
Handles made on lathe.....July 136
Hardware, old-style.....**Dec. 181**
Hasselblad camera.....**Aug. 184**
Heat and money saving.....**Nov. 182**
Heat that travels like light...Oct. 230
Henhouse-draft stopper.....Sept. 215
Hex-wrench handle.....Sept. 217
Hiker, gas mule boosts.....Sept. 224
Hinge aids door hanging.....Aug. 232
Hinges, adhesive-bandage.....Oct. 268
Hints from Model Garage...July 145, Aug. 161, Sept. 185, Oct. 199, Nov. 199, Dec. 199
Hobby horse.....Nov. 213
Holes, overlapping, jig for.....Nov. 229

HOME MAINTENANCE

Attic fan, installing.....**July 191**
Chemical dries room.....**Aug. 177**
Concrete-block garage, building.....**Aug. 145, Sept. 218**
Concrete incinerator.....Sept. 226
Deflector, coal chute.....Nov. 238
Experts show how to move..Oct. 208
Floor sag, curing.....**Dec. 202**
Floor squeaks, stopping.....Nov. 266
Frozen pipes, thawing.....**Dec. 234**
Insulation for water heater....Aug. 238
Oil burner, installing.....**Sept. 173**
Plasterboard walls, patching..Sept. 230
Put up a sign.....**July 182**
Roof ice, preventing.....**Nov. 239**
Running water from heater.....July 141
Saving heat and money...Nov. 182
Shutters make difference...Oct. 206
Stucco, repairing.....**Sept. 188**
Traps, preventing freeze-up....Sept. 215
Winterizing your home.....**Oct. 177**

House, how to buy.....**Sept. 166**
House wreckers, bargains from.....**Nov. 230**
Humidifier from photo tray.....Oct. 268
Hydraulic brakes, trailer.....**Dec. 195**

I

Ice dams on roof, preventing Nov. 239
Incinerator, concrete.....Sept. 226
Infrared bulbs, uses for.....**Oct. 233**
Insulating your home.....**Oct. 181**
Insulation for water heater.....Aug. 238
Iron ore hauled by belt.....Oct. 274
Iron rods, pipe helps twist.....Aug. 176

J

Jaguar, scale model.....**Nov. 206**
Jewelry made on lathe.....**Dec. 219**
Jigsaw, how to judge.....**Oct. 202**
Jointer, how to judge.....**Nov. 233**

K

Kerosene-fed cars.....**Dec. 193**
Keyhole light.....Aug. 152
Keys identified by dominoes.....Nov. 181
Kitchen mixer answers $64 science questions.....**Aug. 178**
Kitchen-notebook hanger.....Sept. 225
Kitchen-paper dispenser.....Oct. 234
Knife rack from curtain rod.....Aug. 153

L

Label holders, curtain-rod.....Aug. 153
Lamp made from jug.....**Dec. 210**
Lamp made from stirrup.....Sept. 187
Lamp, portable outdoor.....July 181
Lamp, three ways to build...Aug. 185

LATHE

Bit angles, checking.....July 185
Bushing stops whip.....Oct. 228
Cabinet handles, making.....July 136
Chuck shims prevent scoring....Nov. 228
Cross-slide chip cover.....Sept. 217
Grinding in the lathe.....Sept. 216
Locking taper shanks.....Nov. 228
Quick gib adjustment.....Oct. 229
Radial drilling.....Aug. 200
Spindle grinder.....**July 184**
Superfine feeds.....Aug. 201
Tailstock tightener.....Dec. 229
Turning to a smooth finish.....Nov. 227
Turning V pulleys.....Sept. 217
Wooden jewelry, making...Dec. 219
Wood lathe, judging.....**Oct. 203**

Lawn mower trims edges.....July 179
Layout blue, container for.....Aug. 200
Leatherworker's tool is fork.....Aug. 176
Lemon juice, extracting.....Aug. 199
Lettering pen, hypo-needle.....Sept. 230
Light bulb is flush valve.....Aug. 186

LIGHTING

Coloring fluorescent tubes.....Aug. 176
Hall light cools house.....Aug. 187
Lighting room for TV.....Sept. 194
Lights for your car.....**July 149**

Lumber, green, how to use...Nov. 177

M

Machine vise, enlarging.....Oct. 229
Magnet starts nail.....Sept. 225
Maple syrup flavor traced.....Oct. 274
Masking tape holds parts.....Aug. 199
Memo pad, wall-mounted.....Aug. 152
Metal trimmer speeds work.....Aug. 207
Mica, undercuts, can opener.....Dec. 228
Model-boat, radio control...Aug. 202
Model-garage hints.....**July 145 Aug. 161, Sept. 185, Oct. 199, Nov. 199, Dec. 199**

MODEL MAKING

Cloth hinges for models.....Sept. 196
Glider drops motor.....**Aug. 188**
Grinder drives model shaper.....**Sept. 210**
Model Diesel.....Nov 205
Model four-cycle engine.....Dec. 232
Model hot rods.....Dec. 233
Scale-model Jaguar.....**Nov. 206**

Motor oils, what you should know about.....**Sept. 211**
Motor, power-tool, judging..Nov. 235
Motor scooter, building.....**July 129**
Motor scooter, streamlined.....Sept. 193
Moving experts show how...Oct. 208
Mower engine shovels snow..Oct. 225
Mower trims lawn edges.....July 179
Multiple tool, judging.....Oct. 205
Music lights Christmas tree.....Dec. 212

N

Nail lubricant in hammer.....Dec. 215
Narrow stock, ripping.....July 165
Nautical tray.....Nov. 213
Neon test circuit.....July 188

O

Oil burner, installing.....**Sept. 173**
Oilcan drip stopper.....Oct. 213
Outdoor lamp is portable.....July 181
Outdoor signs.....**July 182**
Overalls pockets, pads for.....Sept. 209

P

Packing for moving.....**Oct. 208**
Paddle, simple way to make.....July 188
Pads protect abrasive wheels.....Dec. 215

PAINT AND PAINTING

Brushes dried in basket.....Oct. 242
Buying auto paint job.....**Aug. 154**
Cleaning rollers.....July 176
Colored stains show grain..Dec. 177
Foil protects brushes.....July 189
How to strain paint.....Oct. 213
Nails help paint furniture.....Sept. 250
Painting a ceiling.....**July 173**
Pipe cleaner is edge brush.....July 188
Protecting paint-can labels....Dec. 212
Rollers, three kinds.....July 173
Spattering tool.....July 136
Tack rag.....Dec. 204
Touch-up swabs.....July 171

Paint improves glove grip.....July 136

Pedal hanger for toy cars.....Aug. 199
Pencil in saw handle.....Dec. 237
Pencil sharpener, fine-point.....Sept. 209
Pencil stand, distributor-cap.....July 146
Phones, sound-powered.....Dec. 238
Phono record calls radio hams....July 172

PHOTOGRAPHY

Cats, photographing.....Dec. 206
Cold-light enlarger.....Sept. 197
Copying, curtain rods aid.....Sept. 252
Dog photos, taking.....Sept. 207
Drier uses hot plate.....Sept. 224
Four prints on one sheet.....Oct. 276
Glue stops film sliding.....July 189
How I shot the circus.....Aug. 184
Modeling clay marks film.....Aug. 180
Neg envelope softens flash.....Oct. 213
Photographing your boss...Oct. 214
Photo hinges from envelopes...Oct. 234
Prize pictures, taking.....July 167
Slides held on tripod shelf.....Nov. 215
String traces oval mask.....Aug. 210
Super camera.....Aug. 182
Tandem cameras shoot big pictures.....Nov. 215
Tape improves neg carrier....Sept. 196
Tripod shoes help snow pix.....Dec. 220

Picnic table.....July 161
Pipe, brier, carving.....Dec. 185
Pipe rolls building paper.....Dec. 180
Planing block.....Dec. 227
Plasterboard, getting into attic....July 171
Plasterboard walls, patching.....Sept. 230
Plastic hood shields wounded...Oct. 274
Plastic pads coat hanger.....Sept. 215
Plastic soap stand.....Aug. 232
Plate rail from curtain rod.....Aug. 153
Pliers used as spanner.....Sept. 217
Plywood corners, types of.....Oct. 266
Plywood cut on sawhorse.....Oct. 185
Plywood walls, curved.....Aug. 172
Poison fools rats.....Nov. 201
Polishing wheel from eraser.....July 141
Portable outdoor lamp.....July 181
Post holes, measuring depth.....July 189
Power-tool motor, judging...Nov. 235
Power tools, used, how to judge.....Oct. 201, Nov. 232
Pulley line moors boat.....Aug. 181
Punch forms radius.....Dec. 228

R

Racer, one-lung.....Aug. 165
Rack shows Christmas cards.....Dec. 211
Rack your tools.....Aug. 192
Radiant-heat experiments.....Oct. 230
Radiator cover hides drier...Oct. 238
Radio, auto, servicing.....Nov. 216
Radio control, model-boat...Aug. 202
Radio hams, phono record calls..July 172
Radio tubes in egg carton.....July 136
Radius-forming punch.....Dec. 228
Railroad, short-line.....Dec. 232
Rat poison, new.....Nov. 201
Razor-blade edge guard.....Oct. 213
Record cabinet, narrow-lumber..Aug. 238
Reflector signs, making.....July 183
Refrigerator, defrosting.....Aug. 181
Refrigerator preserves batteries..Sept. 203
Refrigerators, what keeps them frigid.....July 162
Ripping narrow stock.....July 165
Roof ice dams, preventing..Nov. 239
Router, how to make.....July 158
Router, using.....July 154
Rubber tubing starts screw.....Nov. 181
Ruler divides circumference.....Aug. 234
Rust, removing from enamel.....Oct. 266
Rusty car, painting.....Aug. 156

S

Sagging door, reinforcing.....Aug. 152
Sander guard saves fingers.....July 165
Sander, how to judge.....Nov. 234
Sander rolls cut from belts.....July 180
Sanding with cotter pin.....Oct. 266
Saving heat and money.....Nov. 182

SAWS AND SAWING

Circular saw cuts disks.....July 160
Circular saw, judging.....Nov. 232
Ripping narrow stock.....July 165
Saw handle holds pencil.....Dec. 237
Sawhorse helps cut plywood...Oct. 185
Sharpening circular saw.....Oct. 235
Sharpening hand saws.....Aug. 170
Slots cut on radial saw.....July 165
Table for electric-drill saw..Dec. 230

Scaffold, tractor-loader used as..July 188
Scissors holder from curtain rod..Aug. 153
Scooter, hood streamlines.....Sept. 193
Scooter, motor, building.....July 129
Scrap-metal art.....Sept. 193
Screwdriver, hex-shaped.....Dec. 229
Screw shoulder built up.....Sept. 216
Screw starters.....Nov. 181, Dec. 237
Scribing line on saw table.....July 165
Seeds planted one at a time.....Sept. 215
Sewing cabinet, making.....Nov. 187
Shaft, protecting.....Nov. 229
Shaper cutter bores holes.....Nov. 227
Shaper from hand grinder...Sept. 210
Shaper, how to judge.....Nov. 235
Shelf bracket from wrenches.....Dec. 218
Shop ideas.....July 184, Aug. 200, Sept. 216, Oct. 228, Nov. 228, Dec. 228
Shutters make the difference.....Oct. 206
Sign improved by chair glides....Sept. 252
Signs for your doorway.....July 182
Silhouette signs, making.....July 182
Silicones in your home.....Nov. 221
Skating rink in back yard.....Dec. 184
Skillet handle from tubing.....Aug. 207
Sled bell clears path.....Dec. 212
Slotting screw heads.....Dec. 228
Slotting with radial saw.....July 165
Small parts held by tape.....Aug. 199
Small parts, paper tray for.....July 189
Small parts stored in oilcans.....Nov. 199
Snow man, experts build.....Dec. 182
Snow, mower engine shovels..Oct. 225
Soap stand holds it upright.....Aug. 232
Soldering, asbestos pad for.....Aug. 201
Soldering equipment hangs up...Oct. 239
Soldering-iron cleaner.....Dec. 180
Soldering-iron rest.....July 160
Sound-powered telephones..Dec. 238
Souping stock engines.....Dec. 189
Spanner, emergency.....July 185
Spanner made from pliers.....Sept. 217
Spark booster starts engine.....Aug. 173
Spark plugs, deep-well.....Oct. 191
Spice box, making.....Sept. 202
Spindle grinder.....July 184
Spotlight, installing on car...July 150
Spring keeps key handy.....Sept. 217
Sprinkler, walking.....July 186
Square, adjusting.....Sept. 216
Squares measure big pipe.....Oct. 242
Stains color wood.....Dec. 177
Starters, car.....Dec. 194
Static generator sparks.....Nov. 205
Steel wool aids soldering.....Dec. 180
Steel wool strains fluids.....Nov. 214
Stencil signs, how to make.....July 183
Stethoscope locates auto rattles.....Oct. 187
Stirrup used in lamp.....Sept. 187
Stock engines souped up.....Dec. 189
Stool, carved, making.....Nov. 185
Storing Christmas ornaments.....Dec. 237
Storm door from screen door.....Oct. 186
Storm sash, staples identify.....Oct. 234
Stroboscope, how to make.....Aug. 179
Stucco, how to repair.....Sept. 188
Sun discolors antique glass.....Oct. 266

T

Table for drill saw.....Dec. 230
Table for picnic.....July 161
Tape spool holds drills.....Aug. 200
Telephones, sound powered Dec. 238

TELEVISION

Antenna lead fastener.....Sept. 250
Big TV tube gets big machine..Oct. 302
Boys build color wheel.....Aug. 173
Color TV "sampler".....Sept. 163
Color unit bolted to set.....Sept. 165
Doghouse, inside.....Oct. 218
Flashlight tests TV lead.....Oct. 213
Lighting room for TV.....Sept. 194
Old lead-in insulates splice...Dec. 180
Old light bulbs cause trouble..Sept. 250
TV interference, stopping..Nov. 210
Thermometer, mercury.....Oct. 242
Tobacco, keeping moist.....July 171

TOOLS

Circular saws, sharpening..Oct. 235
Drills and drilling.....Dec. 221
Drill-saw table.....Dec. 230
Emergency spanner.....July 185
Grinder drives model shaper.....Sept. 210
Handsaws, sharpening.....Aug. 170
High-speed drill press.....Dec. 225
Judging used power tools..Oct. 201, Nov. 232
Miniatures fit aspirin box.....Dec. 232
New shop ideas..July 184, Aug. 200, Sept. 216, Oct. 228, Nov. 228, Dec. 228
New tools.....July 177, Aug. 190, Sept. 204, Oct. 223, Nov. 225, Dec. 208
Rack your tools.....Aug. 192
Router, how to make.....July 158
Router, how to use.....July 154
Sheath saves tool pockets.....Dec. 218
Slicked-up tools work better.....Nov. 237

Towel rack from curtain rod.....Aug. 153

TOYS

Bank hides coins.....Oct. 217
Chest, shelves, tidy room..Dec. 216
Doll-house furniture.....Dec. 214
Duck wags head when it walks..Dec. 217
Easel wipes clean.....Nov. 238
Hobby horse.....Nov. 213
Lighted jack-o-lantern.....Oct. 185
Living-room pony.....Dec. 213
Pin-up board holds toys.....Dec. 218
Piston holds toy pedals.....Aug. 199

Trailer brakes, hydraulic.....Dec. 195
Trailer wheels retract.....July 153
Transformers test power lines.....Oct. 302
Transmitter controls models..Aug. 202
Tray, bedside, support for.....Aug. 175
Tray doubles as footstool.....Aug. 198
Tray, nautical.....Nov. 213
Trees felled by bulldozer.....Nov. 181
Tree stumps, burning.....Dec. 180
Tree stumps sawed flush.....Nov. 214
Tripod shoes help snow photos....Dec. 220
Typewriter-paper holder.....Aug. 199

U, V

Undercoating your car.....Oct. 193
Vacuum cleaner service notes....Oct. 220
V block is renewable.....Oct. 228
Ventilator light.....Aug. 187
Vise adjuster.....Nov. 229
Vise, enlarging jaws for.....Oct. 229
Voice powers telephones.....Dec. 238

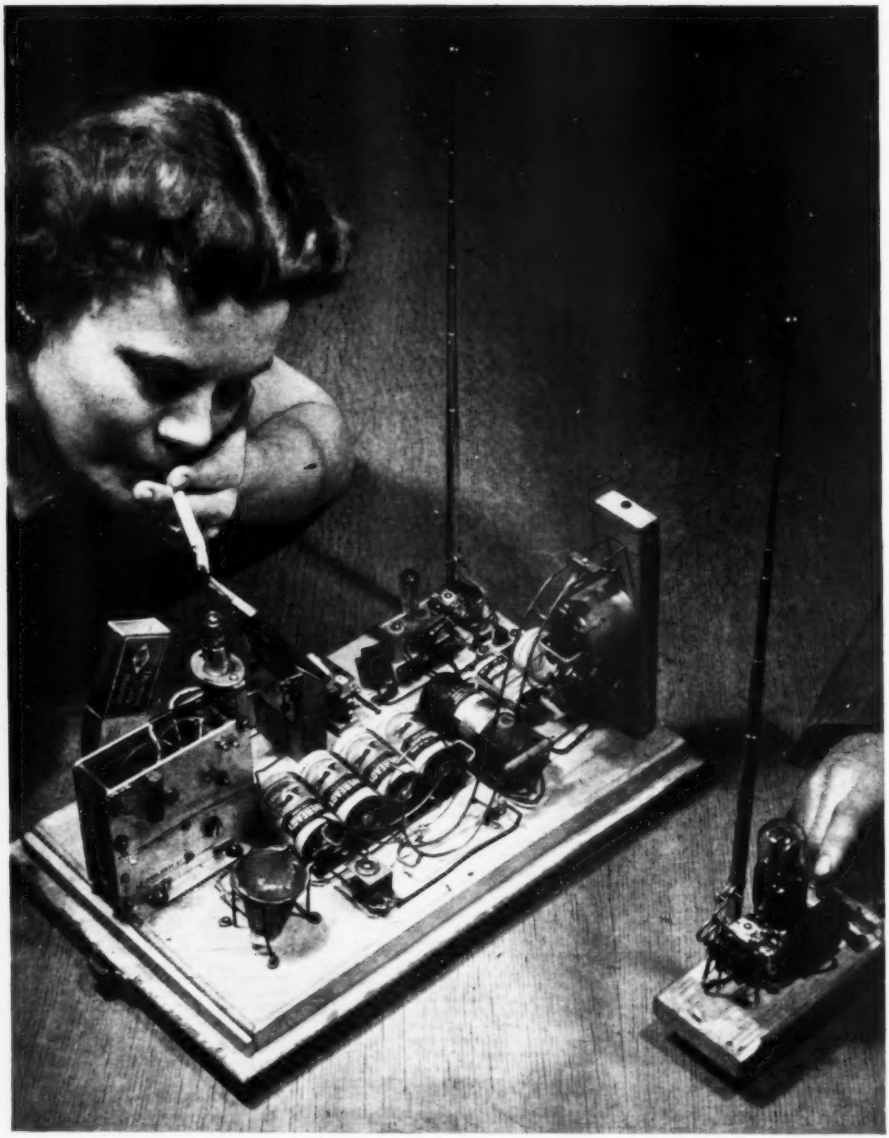
W

Waffle iron, electric.....Sept. 226
Wallboard, nail set removes.....Oct. 186
Walls, curved plywood.....Aug. 172
Warfarin (rat poison).....Nov. 201
Water heater, electric.....July 170
Water heater, insulating.....Aug. 238
Water heater, running water from July 141
Welding jig for butted ends.....Oct. 228
Welding shield from tin can.....Oct. 252
Weld renews engine keyway.....Dec. 229

WINTER SUGGESTIONS

Button up your car.....Sept. 180
Car heater tips.....Dec. 188
Frozen pipes, thawing.....Dec. 234
Preventing roof ice dams..Nov. 239
Starting your car.....Nov. 189
Traps, preventing freeze-up....Sept. 215
Winter driving aids.....Oct. 192
Winterizing your home.....Oct. 177
Winter motoring tips.....Nov. 195

Wire carries 330,000 volts.....Oct. 274
Wire guided through wall.....Aug. 176
Wooden bowl is tied together...Dec. 184
Wood-grain color stains.....Dec. 177
Wood, green, how to use....Nov. 177
Woodworking tips.....July 165
Wrapping gifts.....Dec. 205
Wreckers offer bargains.....Nov. 230
Wrench makes shelf bracket.....Dec. 218



With This Machinery You Strike a Match

AN ELECTRONICS engineer with a Rube Goldberg sense of humor designed this radio-controlled cigarette lighter.

The control transmitter is the one-tube unit at right. When the receiver picks up a signal pulse, a ball bearing is released from the upright wood block, rolls down the wire track, performs a neat loop and drops into the funnel. This turns on a switch that starts a spring-wound motor, and the motor trips a mousetrap that has a match on one end. The match strikes against the matchbox and you're ready to light up. The match is not blown out by radio.

JANUARY TO JUNE, 1952 • VOLUME 160 • NOS. 1 TO 6
POPULAR SCIENCE MONTHLY

Mechanics and Handicraft INDEX

Items in heavy type are page or more in length

A

Abrasive papers, data card.....Mar. 205
AC generator, building.....Mar. 179
Aerial photographers.....Feb. 220
Air compressor.....Jan. 212
Aluminum, what it contains.....Apr. 270
Ampere, defined.....Feb. 194
Amputees, special tools for.....Apr. 229
Angle-drilling jig.....Jan. 217
Antenna, TV, lightning-proof your.....June 158
Antennas, car, push-button....May 170
Antenna tunes in on sun.....Mar. 288
Ark of Oshkosh.....Apr. 230
Arrow "shot" through glass Mar. 232, Apr. 217
Atomic-explosion viewer.....Feb. 206
Auto-body solder fills wood.....May 219

AUTOMOBILES

Cars without carburetors? May 174
Custom car from wreck.....Feb. 201
Expert balances engines..Feb. 190
Expert soups stock V-8....Jan. 172
Hints from Model Garage Jan. 181, Feb. 199, Mar. 199, Apr. 197, May 181, June 171
Old Ford now a roadster.....Apr. 198
Plastic sports-car bodies....May 172
Pop-up car trunks.....Feb. 188
Saving car from fire.....Apr. 192
Shock absorbers.....June 160
Used-car buying, tips.....Apr. 189
Where's the car key?.....Jan. 177

ACCESSORIES

Accessory-switch mounting.....Feb. 200
Antifreeze tester.....Mar. 194
Auto-top carrier.....May 177
Car-key ejector, making....Apr. 191
Emergency fuel can.....May 171
Fire-extinguisher bracket.....Feb. 199
Lamp for emergencies.....Jan. 182
Lock keeps hood up.....Apr. 197
Lunch tray.....May 181
New items for motorists....Apr. 190
New products for car.....May 176
Pans store tools in car.....Feb. 199
Push-button car antenna....May 170
Trappings for new cars.....June 166
Twist-drill handle.....June 172
Window-cleaner bottle.....Jan. 182

AIDS FOR DRIVERS

Car key, keeping safe.....Jan. 177
Clamp holds warning flag.....Mar. 184
Coins, keeping handy.....Apr. 198
Converting car to bed.....Mar. 195
Cords switch garage light.....Feb. 200
Driveway turntable.....June 173
Fuse puller.....Apr. 197
Gauntlets protect clothes.....May 182
Lock-button indicator.....Jan. 181
Paint cuts dash-bulb glare.....Jan. 182
Soap stops windshield fog.....Mar. 194
Trunk, keeping neat.....June 171

BODY CARE

Car locks, fixing.....Feb. 202
Chromes, new car.....Mar. 189
Convertible top, saving.....June 172
Convertible top tips.....May 175
Dashboard, regraining.....Apr. 193
Dome-light glass repair.....June 171
Eave trough, calking.....Jan. 182
Oil prevents trim rust.....Apr. 197
Seat spring, repairing.....Mar. 199
Shift lever, quieting.....Mar. 199
Spotlight, pad protects.....Mar. 199
Tailpipe, holes drain.....Jan. 181
Trim care.....Mar. 191
Vibration, shift-rod.....June 171
Window crank, tightening.....Mar. 200
Wiper blade cleans windows..Apr. 193

ENGINE CARE

Battery-clamp removal.....Mar. 200
Battery, keeping alive.....Feb. 195
Battery, saving.....May 181
Battery, silicones protect.....Feb. 201
Cooling-system tips.....June 165
Expert balances engines....Feb. 190
Gas, testing for water in.....Feb. 201
Oil, how you can save.....Mar. 192
Oil, why engines burn.....Mar. 193
Overdrive, lubricating.....Feb. 200
Overhead-valve tips.....May 182
Tile prevents shorts.....Feb. 200

SERVICING

Carburetor, buzzing.....May 182
Dust affects car radio.....Apr. 197
Shock-absorber filling tool.....Mar. 200
Shock absorbers.....June 160
Stalling, rough idling.....June 171
Tube brush spreads cement.....Feb. 199
Wrenches, two from one.....Mar. 200

WHEELS AND TIRES

Bubble liquid spots leak.....Jan. 270
Does rubber burn off?.....Jan. 270
Inner tube quiets jack.....May 181
Jack-handle hook.....Feb. 199
Photo shows tire damage.....Apr. 191
Tire pump, improving.....Jan. 181
Tire pump, storing.....June 172
Washer keeps stem up.....Mar. 199
Wheel weights, seating.....May 181
Whitewalls for $1.....Apr. 193

Awning raiser, electric.....June 176
Awnings make pup tent.....May 194
Awning strip diverts rain.....Apr. 207

B

Baby-proofing drawers.....Mar. 208
Balancing auto engines.....Feb. 191
Bamboo dresses end table.....Apr. 240
Bandsaw-blade jigs.....June 211
Baseball, shoe polish whitens....Apr. 224
Basement shelves, improve..Jan. 190
Bas-relief, copper.....Apr. 182
Battery, auto, tips.....Feb. 195
Battery, silicones protect.....Feb. 201
Bearings improve lathe rest.....Apr. 223
Bed made in car.....Mar. 195
Bellows, fireplace, making.....Jan. 206
Bike made from trike.....Feb. 213
Bird feeder from old pan.....Apr. 224
Birds, fish share bowl..May 208, June 157
Blackboard: see chalkboard
Black-top driveway.....May 192
Blowtorch fire, smothering.....Mar. 239

BOATS AND BOATING

Ark of Oshkosh.....Apr. 230
Boat bails self, can't sink.....Mar. 288
Inboard power for rowboat May 196
Outboard runabout.....Apr. 182
Racing hulls copy "Saucer"....Apr. 231
Repairing dinghy canvas....June 202
Bolts used as screw gauge.....June 200
Bottle craftwork.....Feb. 186
Bottle saves place for post.....Mar. 186
Bunk beds, double-deck.....Feb. 204
Bustle expands garage.....June 185

C

Calendar for home handyman Jan. 171, Feb. 185, Mar. 183, Apr. 203, May 207, June 173
Caliper, making precise.....June 200
Camera earns $500 a day....Jan. 192
Camper's flashlight holder.....June 211
Carburetors, cars without...May 174
Cart carries golf clubs.....Mar. 184
Cedar dresses up yard.....Mar. 236
Chair, child's, making.....Jan. 207
Chair for TV, making.....Jan. 206
Chairs, webbed, repairing.....May 188
Chalkboard, making.....May 184
Chalkboard paints.....May 184
Chick feeder made from barrel....Feb. 184
Chisel held safely by broom.....Feb. 214
Chisel nails don't split wood.....Feb. 239
Chrome on new cars.....Mar. 189
Cigarettes in bandage box.....May 219
Clamp, quick-set.....Feb. 235
Clay statues.....June 215
Clothes dried in hamper.....Jan. 183
Clothespins make wood pegs.....May 193
Coasters cut from cans.....Apr. 239
Cobbler's bench.....May 166
Coffee-pot handles, using....Apr. 221
Collars, bronze, for tools.....Mar. 227
Collar stays, rack for.....Feb. 239
Compass, keeping sharp.....Jan. 205
Compressed air, using.....Jan. 212
Concrete blocks build stairs.....June 204
Concrete mixer.....Jan. 201
Concrete-post form.....May 213
Concrete walls, painting.....Apr. 240
Convertible, auto, tips.....May 175
Cooling a hot house.....June 174
Corners, wood, rounding.....Jan. 222
Cornice, cardboard-covered.....Mar. 244
Cornice, how pro covers.....Feb. 233
Corrugated fasteners, uses.....Feb. 185

CRAFTWORK

Arrow "shot" through glass Mar. 232, Apr. 217
Bellows, fireplace, making.....Jan. 206
Bottle craftwork.....Feb. 186
Brass basket holds logs.....Feb. 224
Craftsmen in uniform Apr. 182, May 166, June 214
Craftwork contest rules Apr. 183, May 167, June 215
Engraving with needles.....Feb. 236
Fireplace scoop.....Feb. 225
Fliers Build Luxury Car.....Apr. 182
GI Radio Station.....June 214
Palette tray.....Jan. 207
Picture frames, glamorizing Apr. 237
Three-Masted Schooner.....May 166
Valentine-gift box.....Feb. 215

Cramps keep stones level.....May 187
Cupolas are his business.....Jan. 191
Current events date photos..Apr. 232
Cutting-fluid tank holder.....Mar. 235
Cycle makes lawn trim easy.....Apr. 239
Cylinders, restoring.....Apr. 222

D

Dado-cutting aid.....May 208
Data cards, saving.....May 201
Decals grain cheap wood.....Apr. 204
Desk for shop wall.....May 209
Desk set.....June 215
Dinghy canvas, repairing.....June 202
Dishwasher, electric.....May 201
Disks, friction chuck turns.....May 203
Domestic water wells.....Apr. 179
Doors trimmed on saw.....Jan. 208
Doors, trimming aid.....Feb. 239
Dormer, adding to house.....June 153
Double-deck bunks.....Feb. 204
Dragon lamp.....June 215
Drawer lock for service truck.....Mar. 183
Drawer pulls from con rods.....June 172

DRILLS AND DRILLING

Angle-drilling jig....Jan. 217
Broken drills, removing....June 200
Drilling and tapping jig....Mar. 234
Drill press as shaper....May 205
Holder fits drill press....June 184
Key holder for drill....June 214
Milling in drill press....Jan. 219
Quick-set clamp....Feb. 235
Tube holds drill oil....Feb. 235
Vise cradle....June 201
Wiggler for vertical use....Jan. 216

Driveway, black-top....May 192

E

Electrical terms defined....Feb. 194
Electric clips, joining....Feb. 207
Electric dishwasher, data card....May 201
Electric hedge trimmer....June 197
Electric outlet, installing....May 210
Electric saw, portable....Apr. 184
Electric trains are fun....Jan. 161
Electroscope, how to make....Jan. 204
Emergency power plant....Mar. 179
Emery cloth tears one way....Feb. 235
Engines, auto, balancing....Feb. 190
Engraving with needles....Feb. 236

EXPERIMENTS

Anybody can milk a cloud....Mar. 218
Atomic-explosion viewer....Feb. 206
Sparks from your fingers....Jan. 202
Why jets fly....Apr. 212

F

Fence posts, water raises....May 219
Fences, ideas for....Apr. 234
Fence-wire tightener....Feb. 244
Fertilizer spreader....May 183
Files, use right one....Jan. 186
Fireplace bellows, making....Jan. 206
Fireplace-log basket....Feb. 224
Fireplace scoop....Feb. 225
Fires, how to photograph....Mar. 220
Fires in cars, combating....Apr. 192
Fish, birds live in same bowl May 208, June 157
Flagstone walk, building....Apr. 199
Flashlight holder, camper's....June 211
Fliers design luxury car....Apr. 182
Flints aren't really flint....Apr. 246
Floor, parquet, from scrap....Mar. 240
Floor-tile laying aid....Mar. 188
Flower box hung on porch rail....Mar. 187
Flowerpots, shelf for....May 187
Flue cover needs no soldering....Mar. 244
Fluorescent-starter tester....Apr. 239
Flying cameramen....Feb. 220
Flying model....May 166
Flying pig (model plane)....June 215
Folding screen, making....May 195
Ford, making bed in....Mar. 195
Fuel injection for cars?....May 174
Fuel pumped from drum....Apr. 198

FURNITURE

Child's chair, making....Jan. 207
Double-deck bunks....Feb. 204
Kitchen stool, making....May 188
Table has lift-off tray....Feb. 216
TV chair, making....Jan. 206
Wood-grain decals....Apr. 204

Fuses protect TV sets....Apr. 211

G

Game board....May 166
Garage, how to expand....June 185
Garbage, lattice hides....Apr. 224

GARDENS AND GARDENING

Electric hedge trimmer....June 197
Fertilizer spreader....May 183
Flowerpots held in shelf....May 187
Gardening machines....May 168
Porch shelves for plants....Apr. 241
Power roller....Mar. 201
Tubs for shrubs....Mar. 209

Gasoline, testing for water....Feb. 201
Gauges, electric-train....Jan. 163
Glass splinters, gathering....Mar. 188
Gluing jigs....Mar. 224
Golf-club cart, welded....Mar. 184
Grained decals finish wood....Apr. 204
Grill, portable outdoor....June 181

GUS

—and the flat-tire case....May 178
—bets on a long shot....Apr. 194
—Car that wouldn't turn left Jan. 178
—gets high-pressure job....Mar. 196
—helps tie a knot....Feb. 196
—warms up road racer....June 168

Gutters, installing, repairing, making....May 161
Gypsum board, bolt files....Mar. 224

H

Hacksaw blade taped to saw....Jan. 208
Hammer grip, improving....Feb. 226
Hamper dries clothes....Jan. 183
Hand sanding, how to do....Mar. 202
Handymen, products for....May 218
Hanging door, shingles help....Jan. 166
Hardboard lap siding, data card....May 201
Hay elevator....June 204
Hedge trimmer, electric....June 197
Holes cut with scriber....Feb. 213

HOME MAINTENANCE

Awning raiser, electric....June 176
Black-top driveway....May 192
Cardboard covers cornice....Mar. 244
Cellar shelves, improving....Jan. 190
Cleaning sink stains....Jan. 191
Concrete wall, painting....Apr. 240
Electric outlet, adding....May 210
Fences, ideas for....Apr. 234
Flagstone walk, building....Apr. 199
Floor, parquet, from scrap....Mar. 240
Garage, how to expand....June 185
Gutters, repairing, installing, making....May 161
Home Handyman's calendar Jan. 171, Feb. 185, Mar. 183, Apr. 203, May 207, June 173
Lamps, improving....Feb. 179
Lattice hides garbage....Apr. 224
Pipe-drip catcher....Jan. 166
Plastic sprays, using....Mar. 185
Porch railing....Apr. 187
Porch roof, ways to use....Mar. 210
Power plant, building....Mar. 179
Pro covers a cornice....Feb. 232
Racks speed kitchen jobs....Mar. 214
Raising the roof....June 153
Refrigerator reminders....Feb. 219
Screening a porch....Feb. 208
Scroll dresses screen door....Apr. 207
Storage, kitchen, tailor-made May 222
Storage space, outdoor....Apr. 208
Water well, digging Apr. 177, May 214
Ways to enjoy summer....June 180

House, cooling....June 174
Humidifier from tin cans....Jan. 208

I, J

Inboard power in rowboat....May 196
Insulated picnic box....May 202
Iron, pressing, rack for....Mar. 214
Jet-propulsion experiments....Apr. 212

K

Kerosene-level gauge....Feb. 231
Key, auto, keeping safe....Jan. 177
Kitchen mallet....Feb. 225
Kitchen, portable....June 181
Kitchen stool, making....May 188
Kitchen-tool storage Mar. 214, May 222
Knife racks....May 223

L

Ladder treads prevent slipping....Feb. 207
Laminating boat models....June 192
Lamp, base clamp for....Feb. 244
Lamps, how to improve....Feb. 179
Lap siding, hardboard, data card May 201

LATHE

Boring bar keeps alignment....Mar. 235
Clutch and brake for lathe....June 201
Filing in lathe....Jan. 188
Friction chuck turns disks....May 203
Graduating in degrees....Jan. 217
Kerosene applicator....June 201
Lathe chuck, removing....Feb. 235
Lathe dog handles pipe....Feb. 244
Lathe sharpens tools....Feb. 234
Mandrel, expanding....Apr. 222
Muzzle your lathe dog....Mar. 233
Racks, cutting....May 204
Table for slitting saw....Mar. 234
Tailstock tool holder....Jan. 217
Threading, trick simplifies....May 226
Wiggler for vertical use....Jan. 216

Lattice hides garbage....Apr. 224
Lawn-fertilizer spreader....May 183
Lead weight cast in jar cap....May 193
Lens mount, plastic....Feb. 224
Lettering aid from T square....Jan. 205
Lever upends heavy drums....Apr. 239
Light for power tools....Feb. 234
Lightning-proof your TV antenna June 158
Locks, auto, fixing....Feb. 202

M

Machine screw holds wood....Mar. 244
Machine-tool work holder....Apr. 223
Magnet holds cutting-oil tank....Mar. 235
Mailbox mounted on old plow....Apr. 187
Mallet helps in kitchen....Feb. 225
Metal-cutting saw....Mar. 234
Micrometer, improvising....Apr. 223
Miller grinds surface....May 204
Milling capacity, increasing....Jan. 216
Milling in drill press....Jan. 219
Milling-vise adjuster....Mar. 234
Milling wiggler....Jan. 216
Model-Garage hints Jan. 181, Feb. 199, Mar. 199, Apr. 197, May 197, June 171

MODEL MAKING

Carving F-89 Scorpion....Mar. 206
Newspaper boats, making June 192
Thunderjet, flying model....June 208

Motor from poker chip....June 195
Movie leaders from old film....Apr. 187
Movies, how I show....June 184

N

Nail-box quiz....June 199
Nails, chisel-pointing....Feb. 239
Nails doubled for strength....Feb. 244
Nails, storing....Feb. 226
Nail tray from eave trough....May 194
Name plate, plastic....Feb. 184
Newspaper boats, making....June 192

O

Oilcan extension....May 182
Oilcan leak, sealing....Feb. 239
Oil, how you can save....Mar. 192
Oiling while drilling....Feb. 235
Oil pump used in mower....Apr. 239
Oil, why engines burn....Mar. 193
Outdoor grill on wheels....June 181

P

Pail smothers blowtorch fire....Mar. 239

May 222
May 223
Feb. 207
June 192
Feb. 244
Feb. 179
May 201
Mar. 235
June 201
Jan. 188
May 203
Jan. 217
June 201
Feb. 235
Feb. 244
Feb. 234
Apr. 222
Mar. 233
May 204
Mar. 234
Jan. 217
May 226
Jan. 216
Apr. 224
May 183
May 193
Feb. 224
Jan. 205
Apr. 239
Feb. 234
June 158
Feb. 202
Mar. 244
Apr. 223
Mar. 235
Apr. 187
Feb. 225
Mar. 234
Apr. 223
May 204
Jan. 216
Jan. 219
Mar. 234
Jan. 216
199, Apr.
June 171
Mar. 206
June 192
June 208
June 195
Apr. 187
June 184
June 199
Feb. 239
Feb. 244
Feb. 226
May 194
Feb. 184
June 192
May 182
Feb. 239
Mar. 192
Feb. 235
Apr. 239
Mar. 193
June 181
Mar. 239

PAINTING

Colored-sealer finish.....Mar. 187
Concrete walls, painting....Apr. 240
Shellac stored in paste pot.....June 211
Soldering iron melts shellac....Feb. 214
Spray-painting small jobs.....Feb. 213
Storing small brushes.....May 187

Palette tray.....Jan. 207
Panels, big, cut on small saw....May 213
Parquet flooring from scrap lumber Mar. 240
Patterns, working with.....Jan. 196
Pegs from clothespin.....May 193
Pet platform rings doorbell.....May 194
Phonograph needles, engraving with Feb. 236

PHOTOGRAPHY

Camera handle.....Apr. 221
Fire, how to photograph....Mar. 220
Flying cameramen.....Feb. 220
His camera earns $500 a day Jan. 192
Movie leader from old film....Apr. 187
Movies, how I show.....June 184
News events date photos..Apr. 232
Shooting good pictures....June 182
Vacation camera check.....May 206

Physician gets car away fast.....June 173
Picnic box, insulated.....May 202
Picture frames, how to glamorize Apr. 237
Pipe-drip catcher.....Jan. 166
Pipe-handling tip.....Feb. 244
Plan taped to shade rolls up.....Mar. 224
Plants marked by glass tubes....Apr. 224
Plants, porch shelves for.....Apr. 241
Plaster mixer rolls to job.....Feb. 244
Plastic name plate.....Feb. 184
Plastic sports-car bodies.....May 172
Plastic sprays, uses for.....Mar. 185
Play yard, portable.....June 180
Plywood sheathing.....Jan. 223
Pocketbook, tooled-leather.....May 167
Poker-chip motor.....June 195
Porch railing.....Apr. 187
Porch roof, ways to use.....Mar. 210
Porch, screening.....Feb. 208
Portable electric saw.....Apr. 184
Portable stands from pipe.....Jan. 208
Post lantern.....Mar. 225
Pot-lid drawer.....May 222
Power plant, making.....Mar. 179
Power roller easy on lawn....Mar. 201
Projector, movie, case for.....June 184
Pulley-size chart.....Mar. 231
Push-button car antennas.....May 170

R

Racing hulls copy "Saucer".....Apr. 231
Racks improve kitchen storage Mar. 214, May 222
Rack stores wood under steps.....Mar. 183
Radio, auto, dust effects.....Apr. 197
Radio in Navy helmet.....Apr. 182
Radio-phonograph cabinet.....May 167
Radio station, soldiers build.....June 214
Radio switch saves steps.....Feb. 227
Rainfall gauge, homemade.....Apr. 227
Rain-making experiment.....Mar. 218
Razor-blade shim.....Feb. 235
Refrigerator reminders.....Feb. 219
Right-angle gluing jig.....Mar. 224
Rolling-pin rack.....Mar. 215
Roof, lifting.....June 153
Rope trick stops raveling.....Mar. 224
Rounding wood corners.....Jan. 222

S

Sandblaster, homemade.....Jan. 215
Sander, power, setups for....June 205
Sanders, power, using.....Apr. 218
Sanding, hand, how to do....Mar. 202
Sandpaper chart, data card.....Mar. 205

SAWS AND SAWING

Big panels cut on small saw....May 213
Circular saw trims doors.....Jan. 208
Dado insert stops splintering....May 208
Multi-purpose saw attachments June 213
Portable electric saw.....Apr. 184
Saw builds own table.....June 157
Sawhorse holds wide work.....Feb. 231
Saw table from bed ends.....Mar. 239
Saw teeth, protecting.....Mar. 188
Tapers, sawing.....Jan. 209

Scale railroading.....Jan. 164
Schooner, model.....May 166
Scorpion F-89, carving.....Mar. 206
Scraper fits many curves.....Mar. 244
Scrap wood yields parquet....Mar. 240
Screen-door scrolls.....Apr. 207
Screened play yard.....June 180
Screen, folding, making.....May 195
Screening a porch.....Feb. 208
Screw gauge, bolts check.....June 200
Scriber cuts holes.....Feb. 213
Scriber in thimble.....Jan. 217
Sealer colors, finishes wood.....Mar. 187
Serving tray, palette.....Jan. 207
Serving wagon.....June 181
Shade rolls shop drawings.....Mar. 224
Shaping in drill press.....May 205
Sheathing, plywood.....Jan. 223
Shellac, solder iron melts.....Feb. 214
Shellac stored in paste pot.....June 211
Shelves, cellar, improving....Jan. 190
Shim from razor blade.....Feb. 235
Shingles help hang door.....Jan. 166
Shock absorbers, car.....June 160
Shop ideas....Jan. 216, Feb. 234, Mar. 234, Apr. 222, May 204, June 200
Shop magnifier lens.....Feb. 234
Shop wall desk folds flat.....May 209
Shrubs, tubs for.....Mar. 209
Silicones protect battery.....Feb. 201
Sink stains, cleaning.....Jan. 191
Slotting headless setscrews.....June 200
Soap dispenser, spray-bottle.....Apr. 207
Soldering iron, protecting.....Jan. 205
Solenoid valve waters hens.....May 187
Souping stock V-8.....Jan. 172
Sparks from your fingers.....Jan. 202
Spice shelf, small.....Mar. 215
Spline, substitute for.....Mar. 235
Splinter insert for dadoing.....May 208
Split cedar dresses yard.....Mar. 237
Spray-painting tip.....Feb. 213
Springs made to order.....May 205
Square holes in sheet metal.....May 204
Stairs are concrete blocks.....June 204
Stairs, offset, save space.....Jan. 171
Stakes, driving.....Feb. 239
Stake truck works as dumper.....Mar. 188
Stands made from scrap pipe.....Jan. 208
Static-electricity tricks.....Jan. 202
Steady rest, improving.....Apr. 223
Steel tape, suction anchors.....Mar. 224
Stirring-spoon rack.....Mar. 215
Storage space, outdoor.....Apr. 208
Storing kitchen tools Mar. 214, May 222

SUMMER SUGGESTIONS

Awning raiser, electric.....June 176
Camera tips.....May 206
Car cooling-system tips....June 165
House, cooling.....June 174
Insulated picnic box.....May 202
Ways to enjoy summer.....June 180

Surface grinding in a miller.....May 204
Swing seat is safe.....May 193
Switch, radio-controlled.....Feb. 227

T

Table has lift tray.....Feb. 216
Tape measure, stiffening.....Mar. 188
Tapers, sawing.....Jan. 209
Tapping jig.....Mar. 234

TELEVISION

British show 1" tube.....Feb. 238
Chair for TV, making.....Jan. 206
Fuses protect TV sets.....Apr. 211
Lightning-proofing antenna June 158
Remote TV tuner, making..Jan. 167

Tent from awnings.....May 194
Threading, oil applicator.....June 201
Thunderjet, flying model.....June 208
Tin cans hold long stock.....Feb. 213
Tin cans make humidifier.....Jan. 208
Tinplate (electric trains).....Jan. 162
Toaster, automatic, data card.... June 196
Toolbox-handle pad.....Feb. 226

TOOLS

Bandsaw-blade jigs.....June 211
Collars make tools safer....Mar. 227
Files, use right one.....Jan. 186
Lathe sharpens tools.....Feb. 234
Milling in drill press.....Jan. 219
New shop ideas Jan. 216, Feb. 234, Mar. 234, Apr. 222, May 204, June 200
Power-sander setups.....June 205
Power sanders, using.....Apr. 218
Power-tool work patterns..Jan. 196
Sandblaster, homemade....Jan. 215
Special tools for amputees.....Apr. 229
Thimble scriber.....Jan. 217
Toolbox test.....Feb. 214, Mar. 208, Apr. 224, May 219
V belts, how they work....Mar. 228
Wrench turns wing nuts.....Mar. 241

Tool shed expands garage....June 185
Tractor serves as furnace.....Mar. 184
Trains, electric, are fun.....Jan. 161
Tray is part of table.....Feb. 216
Truck noise, silencing tips.....Jan. 181
Trunks, car, lids pop up.....Feb. 188
T square makes lettering aid.....Jan. 205
Tweezer jaws, knurling.....Jan. 205
Twist drill, handle for.....June 172

U, V

Uranium output spurred.....Jan. 252
Used-car buying, tips.....Apr. 188
Vacation-time camera tips...May 206
Vacuum cleaner, freeing hose.... Jan. 205
Valentine-gift box.....Feb. 215
V belts, how they work.....Mar. 228
V-belt tightener.....Mar. 188
Venetian slats catch drips.....Jan. 166
Vise cradle.....June 201
Vise rule saves time.....Feb. 235
Volt, voltage drop defined.....Feb. 194

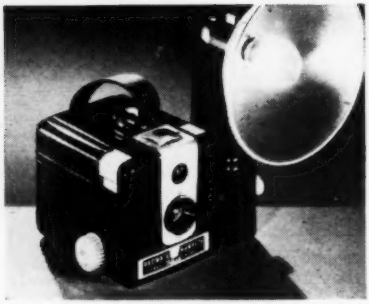
W, X

Wall desk for shop.....May 209
Walls, concrete, painting.....Apr. 240
Wastebasket goes nautical.....Mar. 241
Water, digging for Apr. 177, May 214
Water on road often a mirage....Apr. 244
Watt, watt-hour, defined.....Feb. 194
Web seats, repairing.....May 188
Weed guards made from tires.....May 194
Weights cast in jar caps.....May 193
Welders win prizes.....Apr. 214
Well, how I drilled Apr. 177, May 214
Window-cleaning hint.....Mar. 188
Wing-nut wrench.....Mar. 241
Wire-fence tightener.....Feb. 244
Wiring electric outlets.....May 210
Wood fasteners do other jobs.....Feb. 185
Wood filled with auto solder.....May 219
Wood finish seals, colors.....Mar. 187
Wood stored under steps.....Mar. 183

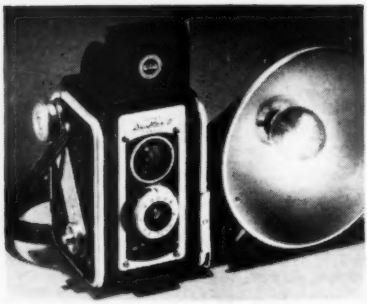
WOODWORKING

Grained decals finish wood Apr. 204
How to do hand sanding...Mar. 202
Parquet from scrap wood Mar. 240
Patterns, using with power tools Jan. 196
Rounding corners.....Jan. 222
Sanders, power, using.....Apr. 218
Sawing tapers.....Jan. 209
Scraper fits many curves.....Mar. 244
Setups, power-sander.....June 205

X-ray photos enlarged.....Mar. 288

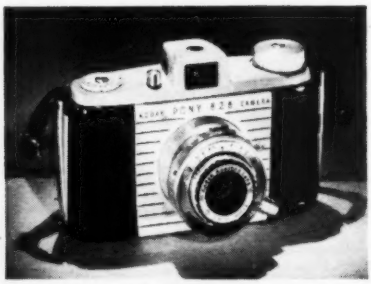


For night and day shots—The Brownie Hawkeye Camera, Flash Model, has fixed-focus lens . . . just aim and shoot. New smooth-action shutter release with built-in flash gives steady exposures. 2¼ x 2¼ negative size. Takes brilliant Kodacolor shots, too. Camera, $7.20; Flasholder, $3.39.

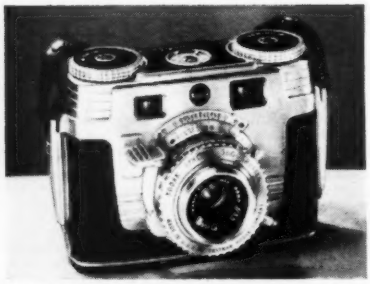


Hooded, view finder in the Kodak Duaflex II Camera previews the picture, big and clear. Two models for black-and-white and color shots: Kodet (shown) is fixed-focus, $14.50; Kodar has *f*/8 lens, double-exposure prevention, exposure guide, $22.30. Kodak Duaflex Flasholder, $3.00.

The Latest . . .



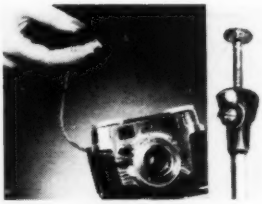
Thrifty color miniature—The Kodak Pony 828 Camera makes superb color slides on Kodachrome Film; sharp black-and-whites; beautiful full-color snapshots from Kodacolor Film. Fine *f*/4.5 lens in 1/200 flash shutter. Average settings marked in red for box-camera simplicity when desired. $31.15.



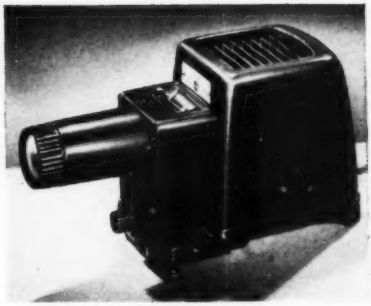
Kodak's new range-finder "miniature" with famous Ektar Lens (*f*/3.5)—the Kodak Signet 35 Camera. Unsurpassed for making brilliant 35mm. color slides. Key features include new-design range finder; 1/300 flash shutter; double-exposure prevention; automatic film stop and counter. $92.50.

Protect your camera with a Kodak carrying case like this handsome leather field case for the "Pony 828." Only $7.00. Other cases from $4.25 to $11.25 (simulated leather case for Duaflex Cameras, $2.65).

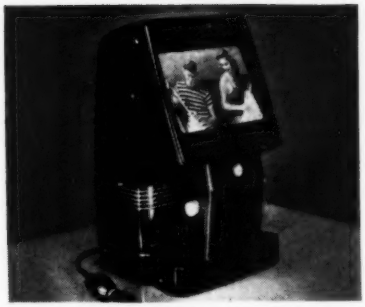
Get into that vacation picture with a Kodak Auto-Release (for any camera equipped with cable release). Set it . . . you have 10 seconds to join the group before the shutter clicks. $3.86.



The professional touch is yours with Kodak Metal Cable Release, No. 5 (left), $1.05, $1.30; or T.B.I. Metal Cable Release, No. 2 (right), $3.43. Sure way to prevent jarring of camera.

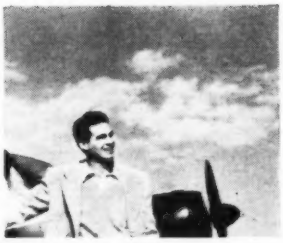


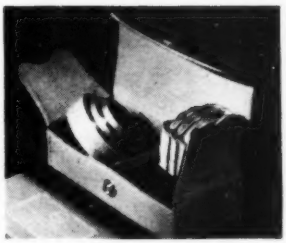
Show off your 2 x 2 slides with the Kodaslide Merit Projector. New easy-feed slide mechanism in *top* of projector means smooth, jar-free showings. Powerful 150-watt lamp and Kodak Projection Ektanon Lumenized Lens, 5-inch, *f*/3.5, give brilliant images on your home screen. $26.10.



For convenient showings in daylight or lighted rooms—Kodaslide Table Viewer, 4X, combines screen and projector in one handy unit. Plug in and you're set. You'll see your vacation slides beautifully enlarged more than 4 times—bright and clear even in a fully lighted room. $49.50.

in inexpensive photo equipment for vacation fun





Filters can do wonders for your vacation shots—The illustrations above show how the yellow Kodak Wratten Filter K2 makes clouds natural-looking. Your Kodak dealer will gladly tell you about filters . . . how you can make spectacular photos of the sky with the red A Filter; about the green X1 Filter for giving faces a natural modeling against blue sky; all about many other types of lens attachments, including Lens Hood for protecting lens from direct sunlight, Pola-Screen for darkening the sky in color pictures, Portra Lenses for close-ups. Prices of filters start at $1.65.

Easy way to protect your filters is provided by the Kodak Combination Filter Case. Handsome leather, with reinforced compartments. Fits neatly in your pocket. One compartment holds Kodak Adapter Ring, Filter, Lens Hood; the second holds three filters. Series V, $4.25; Series VI, $4.95.

Store up to 240 cardboard slides in the deluxe Kodaslide Compartment File—or 96 glass slides. Has 12 handy swing-out compartments. Index inside cover. $3.94.

Only $1.57—keeps slides protected and organized, ready for instant use. The Kodaslide File Box is a sturdy metal box for convenient storage of 150 cardboard or 55 glass slides.

Your Kodak dealer is prepared to give you valuable help in the selection of photographic needs for your vacation. Why not take advantage of his training and experience today? He'll be pleased to see you at any time.

Prices are subject to change without notice and include Federal Tax where applicable

EASTMAN KODAK COMPANY, ROCHESTER 4, N. Y.

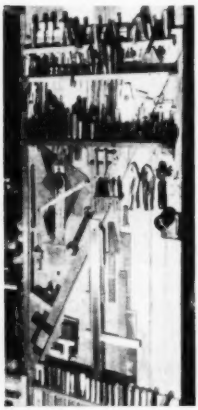
Kodak

Drill Dries Paintbrush

AFTER a paintbrush has been cleaned it can be quickly spun dry with an electric drill. Make a pilot hole in the end of the handle. Cut the head off a nail and force the nail into the hole. Then chuck the other end of the nail in the drill and switch on the juice.—*Ken Murray, Colon, Mich.*

Door Serves as Tool Rack

LARGE numbers of workshop tools can be accommodated on a door. Use the door to your workshop or the side door to a garage. Install shelves, pegs and racks to suit the tools you want to store. Even squares and triangles can be handled. Reinforce the door, if necessary, and replace butt hinges with strap hinges. Secure the strap hinges with carriage bolts instead of screws—bolts will hold when screws might pull out. An extra diagonal brace on the opposite side of the door is a good idea to support the added weight.—*Hi Sibley, Nuevo, Calif.*



Toy Wagon Makes Conestoga

JUNIOR-GRADE cowpunchers will have more fun at the neighborhood roundup when they can take their own covered wagon along. The frame for the top is held to the wagon with four ¼"-20 bolts through the wagon's sides. Wagon dimensions vary but the top must be high enough to clear the heads of passengers. The bows are cut from ¾" by 10" lumber or plywood and lap-jointed with glue and screws to the uprights. Five slats nailed to the bows support the cloth cover, which can be an old sheet or blanket.—*Edward J. Bickel, Chicago.*

Wrap Protects Auto Bearings

WHEN you remove a bearing from a car, wrap it in clean paper until there's time to wash and inspect it. A little dust or dirt inside may easily cause scoring later.

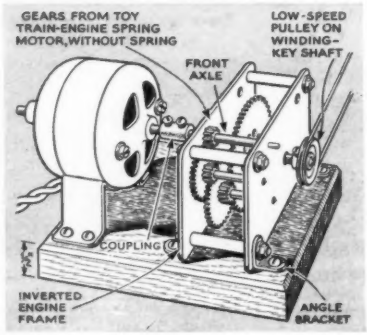
Wind-Up Motor from Toy Engine Becomes Reduction Gear

COUPLE a small motor to this little speed-reduction unit to agitate your developing tank or to power slow-moving toys, models and window displays.

The unit is made from an old toy-locomotive spring motor, using only the front axle, the gears and the winding key.

A short length of brass tubing and two setscrews link the electric motor to the gear unit. The assembly is mounted on a wood base with four angle brackets.

The motor could also be belted to the unit, obtaining additional speed reduction by using a small pulley on the motor and a larger one on the front axle of the gear train.—*Freddy Mitchell, Simsboro, La.*



ARE CLEARED TO COME IN!

Special skills expertly maintain the global operations of our expanding United States Air Force. It is special skills of trained craftsmen, behind the flying skills, that keep our modern air power aloft to defend our nation.

Men with training as former specialists in any Service . . . or non-veterans with special technical talents . . . are needed *now* to support our ever-growing air might. Radio, radar and other communications specialists, weather, armament, automotive maintenance, medical technicians and many technical skills are urgently needed . . . now . . . today!

For your specialized "know-how," your Air Force offers greater opportunities for advancement, security and a rewarding sense of an important job well done.

Here, briefly is the story: If qualified, you can enter the Air Force in an attractive grade, according to your present ability. The Air Force will tell you exactly what your initial rank and pay grade will be before you join-up. Veterans, if qualified, enter in their old grade or better and will skip basic training and be assigned initially to a nearby Air Force Base.

For the rest of the story in detail, consult your local U. S. Army-U. S. Air Force Recruiting Station immediately, or *mail coupon today!*

U.S. AIR FORCE

MAIL COUPON TODAY *for Full Information*

AIRMAN PROCUREMENT
Headquarters, U. S. Air Force
Washington 25, D. C.

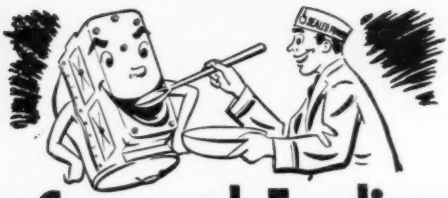
Please send me details about U. S. Air Force specialists.

NAME _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____

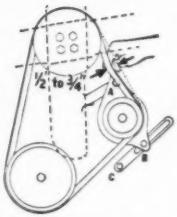
SPECIALTY _____



Care and Feeding of Engines

BY S. P. CORP

FAN BELT FACTS



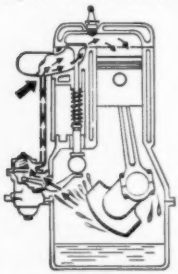
Your fan belt does a triple job. It drives fan, water pump, and generator. If too tight, it causes rapid wear of water pump and generator bearings. If too loose, it will slip, wear out too fast, permit engine to overheat, and permit battery to run down.

To replace a worn fan belt, loosen generator clamp bolts A, B, and C. Move generator toward engine, loosening belt so it can be removed. Be sure to get a new belt made for the year and model of your car. Place it on pulleys, then move generator away from engine until belt will deflect ½ to ¾ inch under your thumb, as shown. Tighten bolt B and recheck tension. If correct tighten A and C.

Even if not worn, it's a good idea to check your present fan belt often for tension.

BOOSTER PUMP CAN WASTE OIL

Most cars have a vacuum booster pump as part of the fuel pump, to maintain vacuum for the windshield wiper. If the booster pump diaphragm is cracked or damaged, oil will be drawn from the crankcase, through booster pump and vacuum line into the intake manifold, where it will mix with gas and be burned.



If your exhaust shows heavy blue smoke when you accelerate, your booster pump may be the cause. It may also cause your wiper to stop when you accelerate.

Disconnect vacuum line at point indicated by arrow. Oil in the line calls for a new booster pump diaphragm. Disconnect gas line to fuel pump. Disconnect vacuum line to windshield wiper. Remove the two cap screws holding pump to engine. Then install a replacement pump obtained from your car dealer or service station.

CHROME CAN TAKE PUNISHMENT

Late-model cars and trucks need Sealed Power KromeX Ring Sets, which use chrome in the right spots to fight heat, friction, corrosion, and abrasion. Top compression ring and steel rails of MD-50 Steel Oil Ring have chrome faces. Write Dept. H-7, Sealed Power Corp., Muskegon, Mich., for free illustrated booklet, "More Power, Less Oil, Less Gas."

Gus Goes Fishing—and Gets Hooked

[*Continued from page 150*]

". . . impossible, Lamson," Dr. Angus was saying. "I did an excellent job on the drums. They must work all right."

"Well, they don't, all the same," the other man insisted. "Every time I put on the brakes I get that thumping sound, and all the talk in the world ain't going to fix it."

Gus fought a little battle with himself there on the doorstep. Here was his chance to show Angus that nothing took the place of know-how when it came to trouble-shooting a mechanical problem. Still, this was his vacation and he'd sworn he wouldn't touch a car except to drive it.

Gus Yields to Temptation

He struggled—and lost. The doctor's cocksure attitude the night before had got his dander up. And besides, he had a professional curiosity about the thumping brakes. The combination was too much for him. He was hooked as surely as one of those trout he'd taken out of the lake the afternoon before. With a sigh of happy resignation, he walked toward the car.

"I see you're an early bird too, Doc."

Dr. Angus looked up with a frown and got to his feet. "Oh, it's you, Mr. Wilson. Yes, up early and starting the day with a problem. This is Clem Lamson—the chap who's having trouble with his brake drums."

Gus smiled and nodded a hello. "Something wrong?" he inquired. "Perhaps I can give you a hand."

"I hardly think you could be of much assistance in this case, Mr. Wilson," Dr. Angus said coolly. "The problem requires further analysis."

The Model Garageman Gets to Work

Clem Lamson looked at Gus and back to the doctor. "Let's tell him, anyhow."

Dr. Angus spread his hands. "No harm in that, I suppose. I finished the brake drums and we put them back on the car last evening before supper. But now Clem claims that his brakes make a thumping noise."

"Where does it seem to come from?"

"Can't tell rightly," said Clem, "but it sounds like the left front wheel."

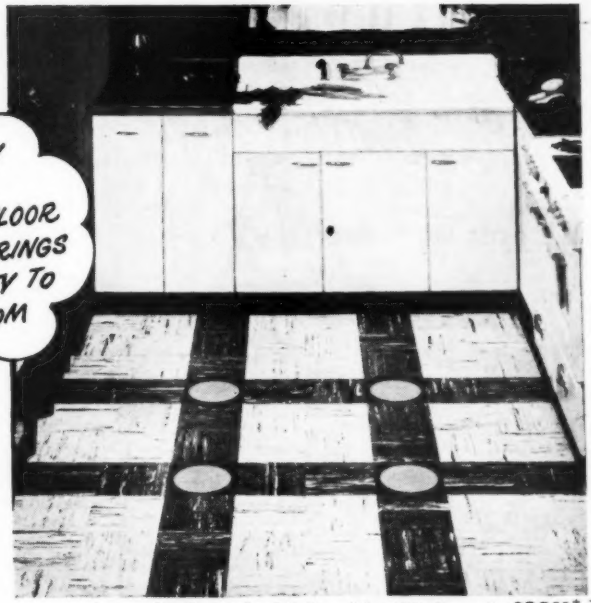
"Mind if I try her out?" asked Gus.

"Nope. Reckon your guess is as good as anybody's. Let's take a little spin."

Gus drove, and the "little spin" proved that Clem was right. The thumping was

[*Continued on page 200*]

NEED A NEW FLOOR?



A long-lasting colorful floor like this for only $22.50*

IT'S MONEY-SAVING FUN TO

INSTALL YOUR OWN KENTILE FLOOR

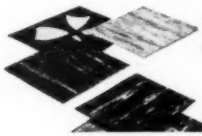
Home handymen (and women) of all ages are finding that it's so easy to lay their own Kentile Floors! The tiles go down one by one ... a few at a time or whole rooms all at once. And, as soon as it's down, the floor is ready for immediate use.

The smart, modern beauty of the 26 light bright Kentile colors lasts for the life of the floor ... colors are permanent because they go clear through to the back of each tile. And, no floor is easier to clean ... just mild soap and water plus an occasional no-rub waxing brings out all the sparkling, decorator beauty.

To find out just what it will cost you to lay a Kentile Floor in any room of your house, consult your Kentile Dealer. He's listed under Floors in your classified phone directory. In Canada, T. Eaton Co., Ltd.

**Price quoted is for a 8' x 9' kitchen. Your floor may cost considerably less or slightly more depending on the colors you choose and the size of your room.*

FREE BOOKLETS. Send for your copies of the Kentile Self-Installation Folder and the Kentile Color Line. Learn how easy it is to install your own Kentile Floor and see the 26 modern colors you can choose from. Kentile, Inc., Dept. H-8, 58 2nd Ave., Brooklyn 15, N. Y.



KENTILE®

The Asphalt Tile of Enduring Beauty

"Well, blow me down!..."

Look at these LOW PRICES for SIMONDS SI-CLONE SAWS"

RIP • CUT-OFF • EASY-CUT and COMBINATION

6" .. $1.75	9" . $2.65
7" ... 2.00	10" .. 3.15
8" ... 2.15	12" .. 4.35

Supplied with round or special-shape center hole for portable electric hand-saw machines.

Simonds, sawmakers for woodworkers since 1832, now offers this complete new line of high quality saws at new popular prices . . . 13 types of blades up to 12" diameter (including Dado Heads and Carbide-Tipped Saws) . . . all made of Simonds Steel and fully guaranteed. Get them at your hardware dealer or local saw shop.

SIMONDS SAW AND STEEL CO.

FITCHBURG, MASS.

Factory Branches in Boston, Chicago, San Francisco, and Portland, Ore. Canadian Factory in Montreal, Que.

Gus Goes Fishing—and Gets Hooked

[*Continued from page 198*]

there, all right, and Gus was sure it was coming from the left front wheel.

Back at the lodge again, the doctor looked on in stony silence as Gus went over the left front end of the car carefully. He checked the tie rods—nothing there. He examined the chassis and motor mounts.

"Got a jack handy, Clem?" Gus asked.

Clem opened the trunk and pulled one out.

"Swell, let's get this left front wheel off the ground. And Doc, could I borrow a wrench and some pliers?"

"You may," Angus replied. He turned toward the lodge.

Careful Check Fails to Spot Trouble

By the time Clem and Gus had the wheel jacked up the doctor was back with a good-sized tool box.

After the wheel had been removed, Gus took off the grease cap, pulled the cotter pin and backed off the nut that held the hub and brake-drum assembly on the spindle. Then he slowly pulled the assembly off, turned it over and inspected the bearings.

"Nothing wrong there," he announced glumly. "Well, we'd better give the brake assembly a going over."

While Clem and the Doc watched, Gus checked the whole brake assembly—springs, wheel cylinder, hydraulic lines. He had just about made up his mind that he was on the wrong track when he happened to run his fingers over the lining on one of the brake shoes. Then he quickly picked up the drum and felt its inner surface.

Gus Suggests a Solution

Just at that point, the screen door to the lodge popped open. "Thought we had an early breakfast date before some fishing, Gus," Bill Plummer called.

"Be with you in a minute, Bill." Gus turned to Angus. "Look Doc, I think if you'll chuck this drum assembly in your lathe and polish the inside of the drum with steel wool, Clem's troubles'll be over. I'll join you after I've had some breakfast."

About a half hour later, as he and Bill Plummer walked into the living room, they heard a car going off down the road. A moment later Dr. Angus walked in.

"Well, Mr. Wilson, I followed your suggestion and it worked. Clem has road-tested his car and there isn't a sign of a noise.

[**Continued on page 202**]

LAKE MEAD NORTH CHANNEL TROUT WATERWAY
OHIO RIVER PUGET SOUND
GEORGIAN BAY LAKE CHAMPLAIN FLORIDA LONG ISLAND SOUND
TVA WATERWAY INLAND WATERWAY MISSISSIPPI RIVER CHESAPEAKE BAY

NOW! Thrilling new horizons for low-cost outboard cruising!

It was bound to come . . . *and it's here* . . . the motor that makes outboard cruising not only completely practical but *tops in cruising fun!* Here's *Power* for the job . . . reliable *heavy-duty* power that gives the comfortable packet above an easy cruising speed of 15 miles an hour . . . top speed close to 20 . . . and with two motors, close to 30 miles! Quiet, *flexible* power, superbly smooth at every speed from "wide open" right down to a drifting troll! Here's *new handling ease* . . . Gearshift with Neutral, Forward, Reverse . . . and Roto-Matic Speed Control . . . with complete Remote Controls available for placement at the helmsman's hand. And separate large-capacity Cruis-a-Day Tank. And ALL at the lowest price per horsepower in the field!

$390

F.O.B. Factory, subject to change without notice

25 HORSEPOWER
Slow TROLLING
ROTO-MATIC CONTROL
GEARSHIFT
CRUIS-A-DAY TANK

*25 O.B.C. certified brake H.P. at 4000 R.P.M. Approved high-speed operating range, 4000 to 5000 R.P.M.

CHOOSE YOUR HULL . . . staunch runabout with shelter top or cabin boat with "all the comforts." *Choose your cruising country* . . . broad highways lead to America's loveliest cruising waters . . . your outboard cruiser can be trailered *anywhere!*

SEE YOUR EVINRUDE DEALER—let him show you the complete line of Evinrude models . . . Big Twin and Fastwin for cruisers, runabouts, large family boats . . . Fleetwin and Lightwin for smaller craft. Look for your dealer's name under "Outboard Motors" in the yellow pages of your phone directory. CATALOG FREE! Write for it today!

EVINRUDE MOTORS 4888 N. 27th ST., MILWAUKEE 16, WIS.
In Canada: Evinrude Motors, Peterborough, Ont.

the Low Cost of PYROIL prevents the High Cost of Repairs!

Your car can get "smashed up"—inside as well as out. When piston rings and cylinder walls are exposed to condensation and rust—when metal rubs against raw metal—it's causing serious damage that will be mighty costly to replace or repair. Pyroil prevents this. When your motor becomes clogged with dirt and carbon deposits, your car loses efficiency. Pyroil cleans your motor and keeps it clean. Even when your car is not being used, your motor deteriorates unless it has the damage-preventing protection of Pyroil.

Pyroil contains the special property of making oil adhere to exposed engine parts, preventing needless wear-and-tear—friction—"dry starts." To prevent the high cost of repairs—add low cost Pyroil—add miles to your car.

Pyroil for Aircraft Engines

Use Aircraft Pyroil B for lubricating oil, Aircraft Pyroil A for gasoline.

GIVEN! An attractive Pyroil metal savings bank—takes coins up to 50c pieces. MOTORISTS, it's yours for the asking—sent postage paid.

Manufactured and Guaranteed by Pyroil Company, 144 Pyroil Bldg., La Crosse, Wisconsin.

Canadian Distributors: Central Purchasing Agencies, Ltd., Toronto, Ontario

PYROIL COMPANY
144 Pyroil Bldg., La Crosse, Wisconsin

I want my car to last and run properly. Please tell me more about Pyroil and how it can accomplish this for me.

Name _____

Address _____

City or Town _____ State _____

Gus Goes Fishing—and Gets Hooked

[*Continued from page 200*]

Would you be good enough to explain it?"

Gus walked over to an old phonograph in the corner of the room and picked up a record. "Here, feel this." He ran his finger over the grooves. The doctor took the record and solemnly followed Gus's example.

A Phonograph Record Proves the Point

"You see," Gus continued, "when you turned down Clem's brake drums your lathe tool left a groove similar to this on the surface of the drum. It was almost invisible, and on some brakes it wouldn't have mattered, but on Clem's it did."

"And why was that?"

"Because the brakes on Clem's car have the 'floating' type of brake shoes. They aren't anchored, but have play. As a result the grooves left by your lathe tool literally screwed the shoes out to a point where they'd suddenly snap back in again and thump against the inside of the hub."

The doctor thought for a moment. "Why didn't the same thing happen on the right wheel? I turned that drum down, too."

Gus held up his two hands. "One right and one left," he said. "The groove on the right wheel was reversed so it forced the brake shoes in rather than out, and in is their normal position. Result—no thump."

Gus Wins the Battle of the Brake Drums

For the first time since they'd met, Gus saw the doctor smile. The smile grew until you could call it an honest-to-goodness grin.

"I want to thank you for teaching me a valuable lesson, Mr. Wilson," Dr. Angus said warmly. "You know, you possess rather remarkable analytical powers, but I suspect you also have a good deal of that 'practical knowledge and experience' you spoke of last night. So you win our little argument after all. Would you mind telling me what line of business you're in?"

"Not at all." Gus grinned. "Most of the year I run a garage. But right now I'm a full-time fisherman. How about joining Bill Plummer and me this morning?"

"Why, I believe I will. By the way, Mr. Wilson, I have a theory about angling—"

"Whoa—don't tell me," Gus broke in hurriedly. "Let's not analyze *that*. Might spoil the fun. Come on, Doc, let's go catch us a mess of trout." END

Next month: Gus helps catch some hijackers.

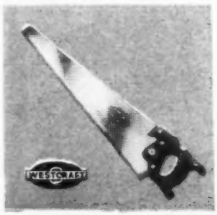
See Why Thousands of Experts Choose These Precision Built Westcraft Tools:

Join the thousands who have discovered that famous, professional quality Westcraft tools give you the same precision engineering and lasting accuracy of other brands costing considerably more. Before you buy **any** tools, see how much more you get by shopping the complete line of guaranteed Westcraft tools . . . yours on easy terms at Western Auto!

● **Tilt Table Jig Saw,** cuts to center of 24" circle. Scotch yoke, oilite bronze bearings. Uses 5" pin or plain end blade ---------- (2H11102) **$19.35**

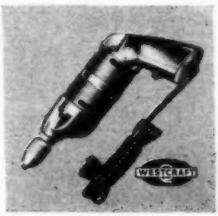
● **17-pc. Socket Set,** ½" Sq. Drive. Alloy steel chrome plated. Twelve 12-pt. sockets, reversible ratchet. 5 fittings... (HR2961) **$18.45**

● **Hacksaw,** chrome-plated adjustable steel frame. Cuts to 3⅜" depth. Durable safety-grip plastic handle with 10" blade ---------- (4HR4159) **$2.25**



8-Point Crosscut Saw, 26" 4-gauge double tapered blade. Precision tempered ----(4HR8329) **$4.85**

7" Lobster Claw Plier. Patented design gives 50% more gripping power --------(HR1138) **$1.25**



¼" Electric Drill, Cutler-Hammer switch, steel-cut gears, 3-jaw chuck. 1 yr. guarantee (2H1379) **$12.25**

14-Piece Accessory Kit with attachments for sanding, polishing, grinding, etc Steel tool box----(2H1378) **$4.69**

Professional Quality—Wizards of Performance

WESTCRAFT TOOLS

Sold by the largest group of associated tool departments in America.

WESTERN AUTO STORES & ASSOCIATE STORES

Sold Only By

NOTE: Western Auto Associate dealers own their own stores and set their own prices, terms and conditions. Prices may vary due to differences in local conditions. If you do not know the location of your nearest Western Auto Store, write Western Auto Supply Co., 2107 Grand, Kansas City, Missouri. (P372)

The inside story of Ford's

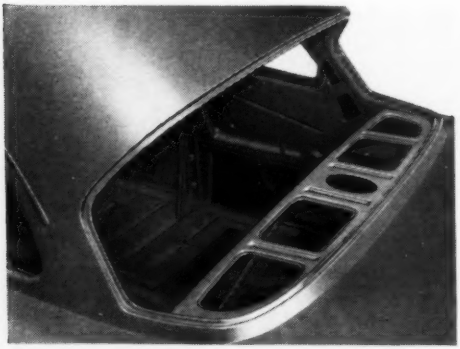
"New design makes Ford bodies the most

Balanced design!

"The ideal in correlation of structural members has been achieved in the '52 Ford. The body unit provides more usable space, unusual visibility, modern beauty . . . *plus* added strength for greater safety and longer life."

New Sound and Weather Protection!

"An important quality feature of the new Ford bodies is their superior insulation against sound and weather. Glass fibre, heavy asphalt impregnated waffled felt pads and mastic sound deadeners are used to damp out mechanically induced sounds. Even the body bolts are insulated with rubber to keep out road noises. A new design door inner panel with continuous rubber strip provides effective sealing against rain and dust."

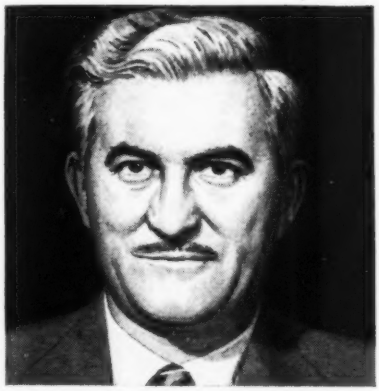


Full Visibility plus extra strength! "3200 square inches of glass give true Full-Circle Visibility . . . 16% more than any other car in Ford's field. Windshield and rear window are completely encircled by husky box-section structures welded to roof rails and other members for greater strength."

More usable room! "By taking advantage of the wider and longer body shell, Ford body engineers have achieved the maximum usable passenger and luggage space. For example, the new Space Saver Hinges and Center-Fill Fueling with its shorter fuel pipe make possible the roomiest trunk in Ford's field."

modern body construction

advanced in their field," says Dr. Roy K. Marshall.



A PICTURE STORY BY DR. ROY K. MARSHALL

Dr. Marshall is a former consultant to the Atomic Energy Commission and a well-known lecturer. He is nationally famous for his simplified explanations of complicated things.

"FOR YEARS TO COME you'll see others follow the design and construction trend started by Ford body engineers.

"The completely new body is a masterpiece of balanced design, with its structural members welded into a unit of strength and beauty never before achieved in the automotive field. For very often, beauty had been sacrificed for strength, or rigidity had been sacrificed for beauty's sake. In the '52 Ford, however, you get a remarkable blending of the two in master coachwork by Ford's master craftsmen."

Over 200 combinations

"When you visit your Ford Dealer notice the careful tailoring of the rich long-wearing upholstery fabrics . . . all color-keyed to interior trim and exterior colors. From more than 200 body, color and upholstery combinations you can choose the one best suited to your taste and your needs."

You can pay more

but you can't buy better!

Ford

White sidewall tires and heater optional at extra cost. Equipment, accessories and trim subject to change without notice.

How You Become a Flying Radar Man

[Continued from page 108]

He found cadet columns swinging along singing the Air Force songs. At first it seemed to him like Hollywood corn. Soon he found himself joining in, and liking it.

Military training, which he'd had before, was a breeze to him. His earlier math and engineering helped with the academic part. New to him were many studies—weather, communications, instruments, navigation, electronics and radar systems—but he stood third in his first comprehensive examination. He remained among the top 10 for the duration of the course.

When the ground training reached airborne radar instruments it really got interesting. The future observers took apart and reassembled the sets they'd soon be using.

Ground Targets Make Blips

With a hand control, they practiced manipulating a radar antenna the way you would an auto spotlight. In the classroom, a simulated target moved in front of the cone-shaped field of "vision" and showed up on the scope as a luminous blip.

Watching the position of the blip, as shown by faint hairlines forming scales, cadets learned to give an imaginary pilot verbal directions that would keep a plane headed toward a target. They found out how to gauge the target's speed of approach by the blip's rate of movement past a range scale, and to recognize its type of flight—approaching head on or from right angles, for example.

From their hard, creaky folding chairs they practiced running intercepts and learned the orthodox approaches in day- and night-fighter tactics. After a few dozen hours of this, they were itching to get up there in a plane and try it.

At last the time came for Floyd to go up, along with two other students. Floyd sat at the No. 1, or control, radar set, his instructor behind him at set No. 2. A second student kibitzed at a radar set in the tail; the third sat with the pilot and copilot in the nose, watching the target ship. Their turns at set No. 1 would come later.

In the air, the instructor ran off a few sample intercepts. Then:

[Continued on page 208]

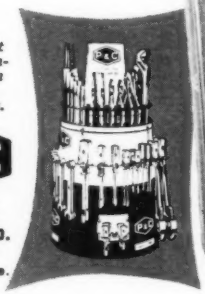
There's two-fisted power . . . in

P & C Hot Forged Tools

make tough jobs EASY!

Built by master craftsmen, P & C tools are "muscle saving" and "fun to use." They get into small openings, fit nuts and screws snugly, balance perfectly in the hand. And special analysis alloy steels plus scientific heat treating makes them stay on the job longer. Look for the P & C rotary tool display unit and get "the *best* tools money can buy."

Write for handy pocket catalog. Complete data on some 300 P & C Tools.

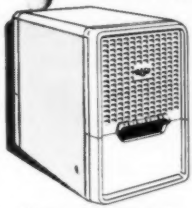


P&C

P & C Hand Forged Tool Co.
Box 5926 F
Portland 22, Ore.

KEEP YOUR TOOLS FREE FROM RUST!

THE FRIGIDAIRE ELECTRIC DEHUMIDIFIER
ends moisture damage in Workshops, Basements, Darkrooms

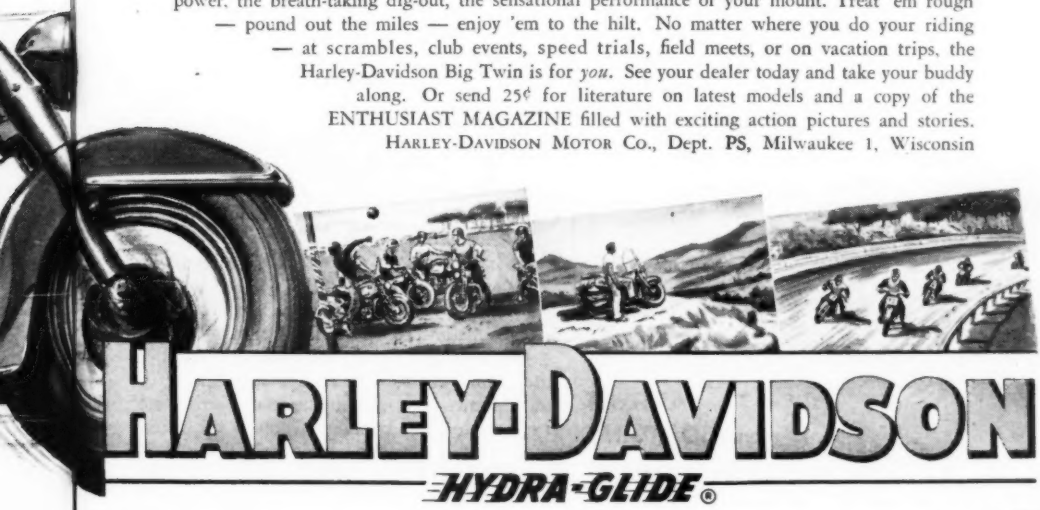


Compact size—put it anywhere—18¼" high—20½" long—11¾" wide

Put a permanent end to moisture damage the instant you plug in this amazing device. Stops mold, rust, mildew. Protects equipment, luggage, furniture. Positively controls moisture in any closed area up to 8,000 cubic feet. No messy chemicals to bother with. Operates on pennies a day. Uses refrigeration principle. Powered by world-famous Frigidaire Meter-Miser compressor with 5-Year Protection Plan. See your Frigidaire Dealer or write for special folder giving full details. Frigidaire Division, General Motors Corp., 1528 Amelia St., Dayton 1, O.

this great motorcycle!

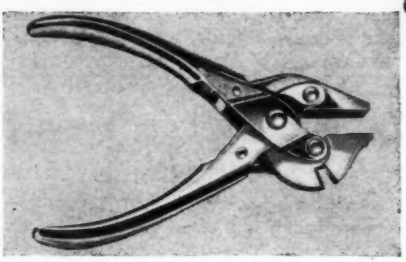
If you like a sky-hootin' scamper — or the thrill from barreling along on a straight stretch, throttle up on the Harley-Davidson Big Twin. You'll get a spine-tingling kick out of the zooming power, the breath-taking dig-out, the sensational performance of your mount. Treat 'em rough — pound out the miles — enjoy 'em to the hilt. No matter where you do your riding — at scrambles, club events, speed trials, field meets, or on vacation trips, the Harley-Davidson Big Twin is for *you*. See your dealer today and take your buddy along. Or send 25¢ for literature on latest models and a copy of the ENTHUSIAST MAGAZINE filled with exciting action pictures and stories.
HARLEY-DAVIDSON MOTOR CO., Dept. PS, Milwaukee 1, Wisconsin



Get the **PLIERS** with the

SARGENT

Parallel-Action Pliers



Extreme Gripping Power is developed by compound leverage . . . parallel jaws take hold like the jaws of a vise.

Outside Cutters cut wire even when it lies tight against a flat surface.

Open Throat permits wire pulling and many other operations that are impossible to do with other types of pliers.

Riveted Assembly assures permanent adjustment of cutting blades and jaws.

See them in 4½", 5½", 6½" and 8" lengths at your hardware dealer or write for details. Dept. 26G.

SARGENT of New Haven

SARGENT and COMPANY

New York • New Haven, Conn. • Chicago

The Tops in Tools...The Latest in Locks

How You Become a Flying Radar Man

[*Continued from page 206*]

"All right, Mr. Few. You take over now."

It felt good to be handling the plane. Even though, as Floyd told me later, "There were just too many things to do for a guy with only eight hands." Eleven controls on the panel, plus the scope and two meters, make 14 things to keep track of. Small wonder if a beginner sometimes gets confused and hits the "panic button."

Calling the pilot's every move, you must keep up a chatter as rapid-fire as a radio announcer's. This is what it sounds like:

Closing in on a Bogey

"Contact, 30 degrees port, range umpty-ump yards, five degrees above, closing speed 40 . . . (You're closing in on a target to the left and above at 40 miles an hour, and give the range in yards; the figure is left out, here, for security reasons.)

"Port easy . . . level off . . . nose up . . . increase speed . . . bogey now umpty-ump yards . . . all possible speed . . ." The chase is narrowing and the bogey tries vainly to shake you off by making a right turn.

"Easy starboard . . . hard starboard . . . ease off . . . you are now at umpty-ump yards . . ." And so it goes until the jet is in position to open fire.

Students learn to follow a bogey making mild evasive maneuvers—then violent ones, turning and weaving in every imaginable fashion. That means a wild ride like the one that introduced Floyd to us. Afterward come critiques in which a student learns his mistakes, and how to avoid them next time. Standards are sky-high and a point system based on training flights, check flights and exams eliminates the weak sisters.

Jets Next Stop

Those who have made the grade, like Floyd, graduate from prop-powered bombers to F-94 jets for four weeks of training with seasoned jet pilots at Tyndall Air Force Base in Florida. Then, out to operational squadrons.

Practice will never be over for them. It takes constant day-and-night flying to stay at the peak. Members of these all-weather interceptor crews take it in dead earnest. A lot depends on one man—he may be the one responsible for knocking down an atom bomber that could have wiped out a U. S. city. It could be Floyd or any one of them.

END

Hammer Test shows how--

THAT CUSHIONY FEELING LASTS LONGER WITH MARFAK Lubrication

Hit *Marfak* with a hammer, and this tough, stretchy lubricant won't splatter or spread—as will an ordinary lubricant. Instead, *Marfak* forms a "collar" around the hammer face. This shows how longer lasting *Marfak* chassis lubricant *stays* put, protects, clings to points of wear and friction. *Marfak* lasts for a thousand miles or more! It's specially compounded to resist jar-out and squeeze-out in spite of roughest going. Resists wash-out, too. That's why *you* enjoy "cushiony" driving that *lasts*. For *Marfak* lubrication, see your Texaco Dealer, *the best friend your car ever had.*

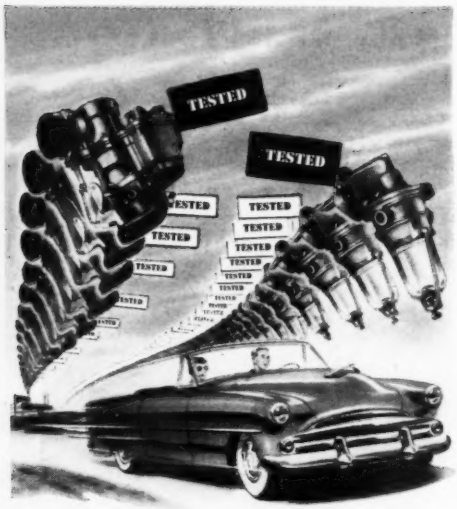
TEXACO

THE TEXAS COMPANY

TEXACO DEALERS IN ALL 48 STATES

Texaco Products are also distributed in Canada and in Latin America

Faithfully yours 50 *for Fifty Years*



For Your PROTECTION

EVERY

CARTER

POWER CENTER

CARBURETER

and FUEL PUMP

is individually TESTED before it leaves our factory

When you buy a Carter Carbureter or Fuel Pump in the original package, you get brand new, pre-tested equipment — NOT a so-called factory rebuilt.

For your protection and motoring pleasure look in the classified section of your phone book under CARBURETER for the service shop or dealer nearest you.

YOU GET A LIBERAL TRADE-IN ALLOWANCE ON YOUR OLD CARBURETER AND FUEL PUMP

CARTER CARBURETOR CORPORATION
St. Louis 7, Missouri
Division of American Car and Foundry Company

$1,000,000 Firms Grow from Hobbies

[*Continued from page 70*]

Navy Office of Information in Washington he got the latest markings used on the plane and the colors it was painted.

Now the SNJ was ready for designing. Bill turned this job over to Henry Struck, five-time national scale-model champion. Three weeks later, Struck brought over an actual model that he had constructed, plus a drawing.

The SNJ, like most such models, contains four types of parts: metal fittings, molded plastic parts, decals for the markings, and the wood pieces. The first three are manufactured by outside firms to specifications provided by Bill. All the woodworking, however, is done at the plant by a crew of nine operating power gang saws, shapers, and specially built cutting instruments.

Parts Are Packaged

Final stage is the assembly line. Some 25 girls sit at a long bench, with stacks of parts piled in front of them. As cartons move along the line, each girl inserts the right pieces. Then out they go to the dealers. Price for the complete kit: $4.95. Engines, bought separately, cost from $5 to $17.

Now, what are the chances for newcomers in this spurting industry—what are the opportunities for the young hobbyist, interested in putting together the pieces others create, to make and sell his own kits?

Field Is Wide Open

Says Gordon Varney of Chicago, whose Varney Scale Models is one of the largest in the industry: "The outlook for a young man is good. There are literally myriads of small items and gadgets which have not yet been touched.

"I would say this: Don't copy existing items. There are too many things that have yet to be done."

How about some suggestions?

"Sure," says Varney. "Electrical gadgets that move are swell, such as an old water mill, a gantry crane, electric signs, windmills, pumping oil wells. You can name hundreds of others."

Ralph P. Johnson, executive director of the Model Industry Association, the industry's trade group, agrees it is an up-and-coming field which a young man could enter with high hopes of success.

Says 26-year-old Jerry Brofman, founder

[*Continued on page 212*]

Don't get stuck with a rust-clogged radiator!

Drain it out, then clean it out. Avoid overheating!

DU PONT Cooling System CLEANSER

Summer is the season when your cooling system must work hardest to prevent engine overheating. That's why it's so important *now*, to be sure your cooling system is really clean. **Du Pont Cleanser** safely and easily removes all the rust that causes trouble. You can even let it work while you're driving. Neutralizer is included in the same can, and there's *no reverse flushing necessary!* Ask for Du Pont Cleanser at your auto supply store today . . . or ask at your service station about the complete Du Pont "Drain Out" service.

After cleaning, prevent rust all summer long with

NEW DU PONT ANTI-RUST and Water Pump Lubricant

It's a cinch to keep new rust from forming in your radiator with **Du Pont Anti-Rust.** This new liquid rust inhibitor not only prevents corrosion, but neutralizes acids, lubricates the water pump and helps eliminate squeaks. It won't clog or cause sludge . . . is harmless to hose and metal parts.

DU PONT

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

YOU SHAVE CLEANER IN ½ THE TIME

"Get it over with" fast with Schick Injector, world's only razor specially engineered to give you "Twice Over" smoothness with "Once Over" Shaving!

No movable parts that get out of adjustment, no detachable parts that can be dropped or misplaced. Specially designed to "fit" your face—under nose, around lips!

Today, get your complete razor kit:

- ★ Gold-Plated Razor
- ★ 12 Scalpel-sharp "Gold Pack" Blades
- ★ Handy Travel Case

Big $1.75 Value. Now Only **98¢**

Only razor offering these 4 advantages

©1952, Eversharp Inc 350 Fifth Ave., N. Y. C

$1,000,000 Firms Grow from Hobbies

[Continued from page 210]

of the Enterprise Model Aircraft and Supply Co. of Brooklyn: "It's not easy—you need lots of know-how and lots of experience, but if you stick to it, you can succeed."

Maybe you want more inspiration—then stand by while the parade of success stories continues to pass in review:

Lud Kading and John Broadbeck are the K & B of the K & B Manufacturing Co. of Compton, Calif. Although only a few years old, their company is selling more than 100,000 "half-A" engines yearly for kit-assembled planes.

Jeep Started Big Business

Gordon A. Babb, head of Ace Products in Pasadena, Calif., sold 1,800 jeep kits in 1942. This year he expects to sell 600,000 jeeps, hot rods, T-rods, midgets and roadsters.

Clyde Austin and his wife, Vera, who run Austin Craft of Burbank, Calif., make all sorts of vehicles that were used in the rip-roaring Old West: buckboards, ranchito carts, covered wagons, stagecoaches.

Eli LaCaille, head of the Frontier Novelty Manufacturing Co. of Los Angeles, also creates remembrances of pioneering days. Last year his sales totaled 85,000 models.

Thomas J. Ayres puttered with model railroads as a boy. Today Ayres Scale Models of Garden Grove, Calif., has a yearly sale of 50,000 kits in the railroad line.

Peter Pan Makes Money

And there's John D. Frisoli. His Scientific Model Airplane Co. of Newark, N. J., begun in a 12-foot-square store, now makes plane and boat kits, racing cars and accessories, and expects to do $200,000 worth of business this year.

Remember Peter Pan, who never wanted to grow up because it was too much fun just being a boy? The guys at the top in this fabulous new industry are spiritual descendants of the wistful Peter—they happened to grow up, but they're still having the fun they had as boys. Plus profits, which is something young Master Pan never had. END

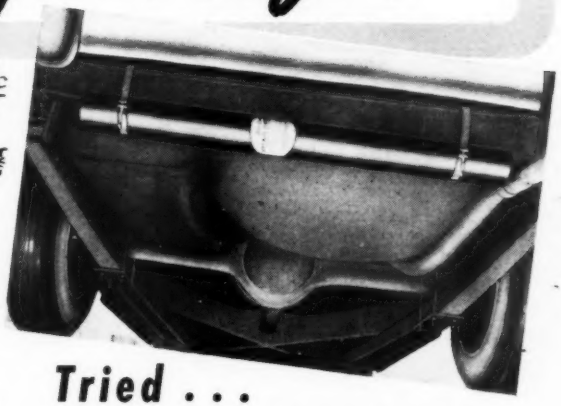
Protecting Electric Cords

To KEEP the fabric covering on an electric-appliance cord from fraying near the ends, coat the edge with shellac before the cord is connected inside a plug or socket. Shellac is an excellent insulator.

Dr. Ross GYRO-SKID CONTROL

ON YOUR CAR... CAN

Save Your Life!



CONTROLS SIDE SKIDS ON ANY SURFACE ... UNDER ANY CONDITION!

Skidding is a result of a lateral displacement of weight. Dr. Ross GYRO-SKID CONTROL acts as a counter centrifugal force and maintains equal weight distribution on both rear wheels. This amazing invention of Dr. William Ross is a 3-foot cylinder which is easily attached to the rear cross member of any car by means of two simple clamps. No car is safe without it!

CONTROLS SIDE SKIDS

ADDS TRACTION

INSURES CONTROL ON CURVES

AVOIDS BLOW-OUT INSTABILITY

ACT NOW...
TRY GYRO-SKID CONTROL ON YOUR CAR AT OUR RISK!

Mail the coupon for immediate delivery. Enclose check or money order. We pay complete postage, everywhere.

DANIELS ENGINEERING CO.
BOOK TOWER, DETROIT 26, MICH.

Tried ... Tested and PROVEN...

As reported in every leading automotive publication and newspaper, Dr. Ross GYRO-SKID CONTROL has been tested and approved by traffic and safety departments from coast to coast. It has been proven on the racing cars of such famous drivers as Troy Ruttman, Walt Faulkner and others. Leading engineers like Clay Smith and Bill Stroppe have tested and enthusiastically endorsed this revolutionary safety device. Now, for the first time, you can have this miracle life-saver on your own family car.

Installs Without Tools In Just One Minute. Interchangeable From Car To Car. Lasts A Lifetime.

$39.95 COMPLETE

DANIELS ENGINEERING CO.
BOOK TOWER, DETROIT 26, MICH.

Enclosed find $39.95 in check or money order. Please rush a Dr. Ross Gyro-Skid Control. I understand the full purchase price will be refunded in 10 days if I'm not 100% satisfied.

Name _____

Address _____

City _____ State _____

The NEW Model 50 UTILITY TESTER

FOR REPAIRING ALL ELECTRICAL APPLIANCES-MOTORS

an all-around electrical trouble shooter

- Measures A.C. and D.C. Voltages, A.C. and D.C. Current, Resistances, etc.
- Will measure the current consumption **while the appliance under test is in operation.** The appliance or utility may be plugged directly into the front panel receptacle. A special pair of insulated clip-end leads is included for motors, etc.
- Incorporates a sensitive direct-reading resistance range which will accurately measure all resistances commonly used in electrical appliances, motors, etc. This range will enable continuity checks and tests for shorts and opens.
- Will test thermostats, radio tube filaments, bulbs, fuses, fluorescents, condensers, switches, field coils, circuit breakers, lighting systems, etc.

Handsome round cornered molded bakelite case 3⅛" x 5⅞" x 2¼". Complete with all test leads and instructions.

$13.90

SHIPPED ON APPROVAL

No Money With Order — No C.O.D.

Try it for 10 days before you buy. If completely satisfied send $3.90 and pay balance at rate of $2.00 per month for 5 months —No Interest or Carrying Charges Added. If not completely satisfied, return to us, no explanation necessary.

SUPERIOR ELECTRONIC CO., INC.
Dept. D-21, 227 Fulton Street, New York 7, N. Y.
Please rush 1 Model 50. I agree to pay $3.90 within 10 days after receipt and $2.00 per month thereafter.
Name .....
Address .....
City..... Zone..... State.....

DREMEL *Electric* **COPING SAW**

CUTS SCROLLS LIKE MAGIC—SANDS AS IT SAWS

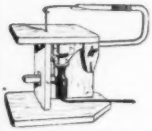
BLADE FACES 4 WAYS

Only **$5.85** with 3 saw blades

MAKE YOUR OWN JIG SAW PLANS FREE!

JUST GUIDE IT!

SAFE! AS A HANDSAW



For home, hobby, repair work—no other tool pleases so much for so little cost. Works in any direction—delivers 7,200 strokes per minute smoothly, effortlessly. Saws through ¾" medium-hard wood at a foot-a-minute speed. Touch-of-the-trigger, foolproof action. Only 2 moving parts, never needs oiling. Uses 110-120 v., A.C. Free plans, packed with each saw, for six useful woodworking projects and for making your own jig saw.

WHERE TO BUY. Dremel Tools are sold everywhere. If your dealer cannot supply you, send remittance in full and we will ship postpaid. Or send only $2 and pay postman balance plus postage and fee. **Money back if not delighted after 5 days' trial.**

DREMEL MFG. CO., Dept. 122-G, RACINE, WIS.

The Great Subway Maze

[*Continued from page 63*]

paper containers are placed in strategic spots on the platforms, but the passengers' aim is often poor and their instinct for neatness weak. It takes 1,502 porters to clean up the daily mess and to wash off the wall drawings of some of the system's more artistic young patrons.

The cost of this constant tidying-up process is several million dollars a year, but there is a shred of financial return. The city disposes of more than 100 tons of waste paper from the subways every month. In one recent year the total income from this strange by-product of underground transportation was $21,000.

Has Anybody Seen My Snake?

Passengers lose more than their tempers on the subway—forgetful riders have left behind thousands of items of property, ranging from $11,800 in cash (never recovered) to the body of a snake, carefully preserved in a jar. Last year 50,000 items were collected, including 6,500 umbrellas, as well as handbags, wallets and jewelry. In other years the residue has included false teeth, a wooden leg, a bass viol, crutches and guns. As the unclaimed property accumulates, the Board of Transportation auctions it off.

People are sometimes moved to write to the Board and tell its members how to improve subway travel, including proposals for smoking cars (no smoking is allowed underground) and dining cars!

Regular passenger cars, costing $66,000, are 67 feet long and seat 80 people. No one has risked a guess as to the maximum number of standees that can be jammed into a car, but inadvertent attempts to find out are made nearly every day. The Board of Transportation cheerily estimates that at the present time during rush hours there are 165 standees to every 100 passengers seated, a figure that callousted subway regulars are inclined to think low.

More Room—Standing Room

Sitting in a subway car seems to be going out of style, anyway. Cars of a special eight-car, stainless-steel train, built in 1949, seat only 54 passengers, deliberately making more than normal room for standees.

Cars similar to these will undoubtedly be purchased for the forthcoming Second Avenue line and perhaps someday will be run-

[*Continued on page 216*]

Builder of the sensational CUNNINGHAM selects CHAMPION spark plugs for America's TOP SPORTS CAR!

Phil Walters driving one of the Cunningham cars in the Watkins Glen, N. Y. Grand Prix. Walters went on to win, setting new lap and average speed records for this event.

Briggs Cunningham at the Bridge in the Watkins Glen race. These cars driven by Walters, Fitch and Cunningham, placed first, second and fourth, in this Sports Car classic.

BRIGGS S. CUNNINGHAM (shown here with a 300 HP, 150 MPH Cunningham open tourer) has made a great contribution to the re-birth of American road racing for sports cars—competition cars suitable for everyday driving. In his Florida plant, Mr. Cunningham is manufacturing American sports cars to compete successfully with the best that Europe has to offer.

"Sports car racing in the United States and Europe imposes extreme demands on engine performance. While this form of racing has its share of sustained top speed driving, it places a much greater premium on flexibility. Phenomenal cornering at unbanked turns, terrific bursts of speed coming into the straightaways, shifting down through gears for maximum power, control and braking at steep grades and corners, then up through gears again for top overtaking speeds—all call for fantastic engine acceleration and equally severe deceleration. Only the most rugged spark plugs can take this grueling punishment and still deliver competition quality performance.

We've found that Champion Spark Plugs more than live up to their great reputation for long life and dependability under these conditions. We use Champions exclusively in the Cunningham cars."

—BRIGGS S. CUNNINGHAM

The Sign of Dependable Service!

FOLLOW THE EXPERTS

DEMAND DEPENDABLE CHAMPIONS FOR YOUR CAR

CHAMPION SPARK PLUG COMPANY, TOLEDO 1, OHIO

send for FREE CATALOG

America's Foremost
money-making
MECHANICS' TOOLS

It's easy to own the same "pay-off" tools used and endorsed by America's top-earning mechanics throughout the automotive, aviation and industrial fields! Snap-on tools help you handle every repair job faster, easier, better. And they LAST . . . pay for themselves over and over again! Start building your own tool set now with basic Snap-on units—add others any time. Genuine Snap-on tools are never sold in stores—direct to users only. Mail coupon for free catalog.

Snap-on Tools
THE CHOICE OF BETTER MECHANICS

SNAP-ON TOOLS CORPORATION
8060-G 28th Ave., Kenosha, Wisconsin
Send me free catalog of Snap-on tools.
Name
Address
City Zone State

CORBIN
All-Weather
PADLOCKS

Big strong ones for general outdoor or indoor use . . . midget models for golf bags or tackle boxes . . . bike locks. They're TOPS in value! Sizes and models for every purpose —

Be sure . . . with CORBIN® AT LEADING HARDWARE STORES EVERYWHERE!

CORBIN CABINET LOCK DIVISION
The American Hardware Corporation
New Britain, Connecticut

The Great Subway Maze

[Continued from page 214]

ning over a belt line from New Jersey to New York and back. Until these additional lines and trains are available, thousands of subway passengers during rush hours will have continued reason to exclaim, as did Tallulah Bankhead in a recent radio skit, "Sir, kindly remove my eye from your elbow!"

Subways May Ease Auto Jams

Anyone who has ridden on a New York subway train during a rush hour, trapped in a strait jacket of perspiring human bodies, can sympathize with the widespread longing among regular passengers for the extra elbow room that more rolling stock and additional routes would afford. But the main reason more subways are needed lies above the heads of the subsurface sufferers. Too many commuters and visitors, inspired by the handsome bridges and vehicular tunnels available, are driving into the city or arriving on out-of-town buses. Add their vehicles to those normally operating in town and you have a daily snarl of street traffic that is threatening to send New Yorkers out of their minds—and, worse yet for local business, out of New York.

No one yet has thought up a workable way to untangle the snarl. Rerouting traffic has caused confusion and raised howls from merchants without taking out the kinks. Now New York and New Jersey planning commissions have begun to wonder if a new subway, linking the two states at the Hudson's banks, might not be the solution.

Overcrowding Isn't New

New York's subways have been a source of wonder and irritation right from their start, on the afternoon of October 27, 1904, when Mayor George B. McClellan (son of the famous Civil War General) ran the first subway train nearly all the way to the end of the nine-mile line.

The lure of the new subway drew so many people that the few station platforms were "packed to suffocation," wrote a *N.Y. Herald* reporter. Another newsman reported in astonishment that "men fought, kicked and shoved to get on!" The crush in the station at the end of the line soon became so great that police reserves had be be called. "Hats were broken and coats torn off."

Variations of that scene have been enacted every day ever since. END

REVERSE GEAR AND NEUTRAL
A gear shift that really works—engineered for outboards only. Salt water proof. Stays in adjustment. Meets Mercury's rigid standards of performance.

TWIST GRIP SYNCHRONIZED SPARK AND THROTTLE. New longer steering handle for easy control.

FULL JEWELED POWER—
ball and roller bearings throughout.

Features of Mercury Motors are protected by issued or pending patents.

Here it is—tomorrow's outboard today! Drive it and see why the new Mercury Cruiser is bound to be copied. For here is an outboard that gives you *more* performance than others of two to three times its rated horsepower—with up to 30% *less weight!*

The New "Cruiser" is another product of Mercury's CREATIVE ENGINEERS . . . men who steer clear of "dead tradition" . . . who are never satisfied with "*good enough*". Thanks to their progressive spirit Mercury outboards OUTPERFORM ALL OTHER MAKES!

See your Mercury dealer for *one* convincing demonstration and you'll *own* tomorrow's outboard today!

Write for free illustrated catalogue—"Move Up To A Mercury" KIEKHAEFER CORPORATION, Fond du Lac, Wisconsin.

Move up to a

KIEKHAEFER

MERCURY CRUISER

The outboard that will still be copied years from now!

Use RUST PROOF NEVER-STAIN

ALUMINUM NAILS

Yes, for less than $4.00*, you can avoid costly premature repainting. When you use "Never-Stain" ALUMINUM NAILS on the siding of your home, you are insured against unsightly rust spots and streaks. No countersinking and puttying necessary — a $60 to $75 additional saving.

When you build or remodel, insist on lifetime "Never-Stain" ALUMINUM NAILS.

*For the wood siding on the average 5-room house.

NICHOLS WIRE & ALUMINUM CO.
DAVENPORT, IOWA

Non-Staining ALUMINUM SCREENING Cuts Paint Costs

ALUMINUM—your best buy in screening... Tough, long-lasting screening made of Alcoa Alclad Aluminum can't rust streak, can't stain light paint or masonry. Before you repair or replace screens, write for free folder showing easy ways for best results.

Aluminum Company of America, 831-G Gulf Bldg., Pittsburgh 19, Pa.

SCREENING MADE FROM ALCOA ALCLAD ALUMINUM

This tag means quality. Look for it on screening you buy.

Mechanics Build Racing Planes

[*Continued from page 120*]

In 1946, Howard and Chester were invited to dust off their plans and go to work. As a result, in 1947, at Cleveland, 13 midget planes got to the starting line and leaped into the sky to compete for $25,000 of prize money in the first Goodyear Trophy Race for midget planes. This year at Detroit the midget race will be the big attraction. Some 75 entries will compete for the Continental Motors Trophy plus cash.

Racing Rules Are Strict

Biggest change from old times is the complex of rules that attempt to safeguard modern midget racing. Rigid regulations governing minimum weights, wing loading, wing area, strength factors, visibility, engine tampering are enforced by the Professional Race Pilots Association, the National Aeronautics Association and the Civil Aeronautics Administration. A pilot must wear crash helmet, parachute, safety belt and shoulder harness. Otherwise, he can fly in his underwear! There is a Race Technical Committee to double-check each entry.

Yet air racing remains the most dangerous of all spectator sports—and one of the most thrilling. It takes pilot skill and nerve to hang on while the midget rounds the pylons at 200-plus miles an hour, not much above the level of the grandstand roof.

Prop Wash Is Dangerous

The prop wash from the guy ahead is tricky. All the rules and regulations to the contrary, the wash can take hold and throw you out of control before you have a chance to save yourself. That's what happened to Art Chester who crashed to death before a stunned audience at San Diego in 1948.

Bob Heisel was another victim of prop wash the same year. Chester Black was killed when his racer fell apart as he pulled up too sharply during a race at Cleveland. Paul De Blois banked too sharply in a midget race, raked the ground with a wing tip and died in flames. Safety rules can't do much to prevent accidents like those.

But what of the future? The jet-propelled midget plane, of course. It's on the designing board. One engine is in the works at Continental and will soon be available. Soon the back-yard mechanics will be wrestling with the problem of how much of what it will take to put a 900-pound "midjet" around pylons at 300 m.p.h. END

SURPLUS MACHINE SHOP TOOLS AT PRICES YOU CAN AFFORD

HIGH SPEED MORSE TAPER SHANK DRILLS

Reconditioned and sharpened—ready to go! Many drills with extra lengths of flute. Immediate delivery. These drills are priced as low as 25% of your present cost and shipped post paid to you.

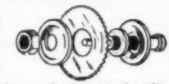
Size in in.	Twist Lgth.	Price	Size in in.	Twist Lgth.	Price
37/64	6¼	$1.00	1-11/64	7¾	$3.95
19/32	4¼	1.00	1-3/16	7½	3.95
39/64	6¼	1.06	1-13/64	8½	4.14
21/32	6	1.19	1-7/32	8½	4.14
11/16	4½	1.31	1-15/64	7½	4.51
23/32	5	1.44	1-21/64	5½	5.38
47/64	5	1.57	1-11/32	9½	5.38
¾	5	1.57	1-27/64	6	9.95
49/64	4½	1.64	1-15/32	8	6.13
51/64	5½	1.85	1-17/32	7	7.16
13/16	22	8.00	1-9/16	10½	7.50
27/32	5½	1.91	1-5/8	10½	8.50
55/64	5½	2.02	1-11/16	12	9.13
7/8	4¼	2.02	1¾	5	6.00
57/64	5¼	2.12	1-7/8	9	11.56
15/16	5¼	2.20	1-15/16	11	12.95
15/16	9¾	4.00	1-31/32	10	13.95
61/64	4¼	2.42	2-1/8	10	15.00
31/32	4¾	2.42	2-7/32	11	16.50
63/64	5	2.50	2-1/4	10¾	17.50
1-1/32	6	2.76	2-9/32	7¼	16.00
1-3/64	8	2.82	2-5/16	7	16.25
1-1/16	7¼	2.82	2-3/8	9	18.00
1-5/64	7¾	3.33	2-7/16	11	21.50
1-3/32	6	3.33	2-15/32	13	23.50
17/64	9	4.00	2-1/2	11	25.00
1-7/64	18½	8.50	2-13/16	14½	27.50
1¼	8½	4.00	3	10	30.00
1-5/32	6½	3.76	4	9	34.50

Large quantities available in every size. 5% DISCOUNT ON PURCHASES OF $50 OR MORE. 10% DISCOUNT ON PURCHASES OF $100 OR MORE.

HIGH SPEED WOODRUFF KEY SEAT CUTTER

SET 4C 5 different size cutters. Can be used as mounted milling cutter or circular saw. All with 3/8" and 1/2" shanks, widths up to 1 1/2". dia. up to 1". New and used. Ppd. Priced at only.... **$3.95**

6 Slitting Saws with Mandrel



SET 34C 6 Different Size High Speed Slitting Saws, 2 3/4" dia. x 1" arbor. Thickness from .040 to .071. Cuts wood, aluminum, brass, steel, etc. PLUS SPECIAL MANDREL which enables use of saws in 1/4" or 1/2" elec. drill. $25 Value. Ppd. Only.. **$4.95**

7 selected, sharp H. S. Slitting Saws as above to use on your own mandrel or milling machine. New and used. Ppd. A bargain at..... **$4.95**

New Carbide Tip Masonry Drills

Carbide tip goes through any masonry. Set of 5 bits containing one 7/32"; three 1/4" and one 5/16". all five. $10 Value. only **$2.49**

NEW 360° SWIVEL TYPE TOOL HOLDER AND BORING BAR

Here is a tool that will do the work of a left, right and straight tool holder, plus a boring bar, all for a fraction of its original cost. Post paid to you.

TOOL A takes a 5/16" sq. bit or 5/16" dia. boring tool. Shank size 9/16"x1"x4 3/4". PPD. Only..... **$3.29**

TOOL B takes a 3/8" sq. bit or 3/8" dia. boring tool. Shank size 5/8"x 1-3/16"x5 3/4". PPD. Only..... **$3.95**

TOOL C. Cut-off blade holder for 3/32"x3 3/4" blade. Shank size 1/2"x1"x4 1/2" (can be changed to fit other size cut-off blades). PPD. Only..... **$2.25**

SET 41C LARGE H. S. STRAIGHT SHANK DRILLS: 5 different size high speed Drills from 3/4" to 1 1/4". Twist length up to 7". Sharp new and used surplus. Specify desired shank dia.: 1/2", 5/8", 3/4", 1", etc. PPD. Only **$14.50**

AIR TANK—REGULATOR—MASK A4 Tank—5" x 8", 104 cu. in., 500 psi.. **$1.50**

D2 Tank—6 1/2"x24", 500 cu. in., 500 psi..... **$3.95**

Demand Type Regulator $1.00; A14 Breathing Mask. $1.60.

Make your own diving apparatus. Mask fits regulator—regulator fits either of above tanks.

Bargain Tool & Shop Mixes!—Ppd.

NEW ROTARY FILE MIX: 7 different size H. S. files, 1/4" shanks. New cost as high as $2.00 ea. Only..... **$4.49**

GRINDING WHEEL MIX: 30 grinding wheels with 1/4" arbors, up to 3" in dia., plus mandrel, only..... **$3.29**

SURPRISE MIX: Over 50 pcs. for your 1/4" elec. drill including rotary files, drills, bits, reamers, grinding wheels and arbors for our customers who like pleasant surprises. Your money back if you aren't satisfied..... **$2.98**

1/4" to 1/2" H. S. DRILL MIX WITH 1/4" SHANKS: 10 different size new and used bits, only..... **$4.95**

100 MOUNTED POINTS: 1/8" and 3/32" shanks assorted shapes and sizes..... **$8.98**

SPRING MIX: 300 new springs, compression, tension and torsion types up to 6" in lengths, only..... **$1.79**

DOUBLE-END END MILL MIX; 4 right hand twist H. S. 3/8" straight shank end mills, up to 3/4" dia. New and used..... **$3.98**

Money Back Guarantee—All Mdse. Mixture of New and Reconditioned Unless Specified New. ALL ITEMS (EXCEPT THOSE SPECIFIED POST PAID) WILL BE SHIPPED F. O. B. TULSA—OR, ADD 10% AND WE WILL SHIP YOUR MDSE. PPD.

Write For Free Catalog Describing Thousands of Bargain Cutting Tools.

T & T TOOL 221 W. SECOND TULSA, OKLA.

YOUR CAR INVESTMENT IS BIGGER THAN EVER

Protect it with Miracle Power

Remember when a new automobile cost around $700? Today, your big investment—and the fact that world conditions indicate it may have to last—are reasons enough for taking care of it.

That's why mechanics and racers say, "Use Miracle Power in oil and gas". They know that oil alone can't protect modern engines against friction and DRY STARTING damage—major cause of engine wear. And oil can't lubricate upper cylinder areas effectively because it breaks down under terrific combustion chamber heat.

Miracle Power assures constant lubrication. It contains colloidal synthetic graphite in suspension. This lubricating graphite clings to metal . . . saves vital engine parts when oil is absent or ruptures . . . provides effective top cylinder lubrication because it keeps lubricating at "red hot" combustion chamber temperatures.

To save your car, use Miracle Power.

At gas stations, garages, Kaiser-Frazer, Ford and other car dealers or use this coupon for introductory offer.

Miracle Power Division
THE AP PARTS CORPORATION
859 AP BUILDING, Toledo 1, Ohio

THE AP PARTS CORPORATION
859 AP Building, Toledo 1, Ohio

Enclosed find $_____ for which please send me *postpaid:*

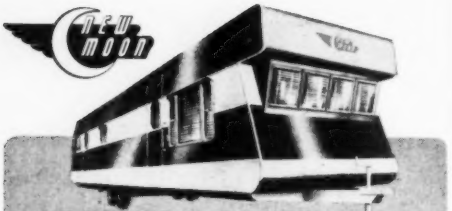
_____trial cans of Miracle Power at 75c each (1 for gas, 1 for oil)

☐ Please send me free literature on making my car last longer.

Name_____

Address_____

City_____ Zone_____ State_____



BETTER LIVING

. . . . *at new low cost!*

Join thousands of happy, worry-free and rent-free New Moon owners. Move to top paying jobs, enjoy travel and vacation fun — a home completely furnished and ready to live-in, including kitchen, bath and automatic heating system. Own a New Moon on our rent-like payment plan and enjoy all the comfort and advantages of genuine home ownership at once.

Free! Write today for literature describing the complete line of New Moon apartment homes.

Member of MMA

REDMAN TRAILER CO.
38 BRIDGE ST., ALMA, MICH.

For Better Work — FASTER — EASIER

THE ZEPHYR Electric Drill

only $18.95

Handy . . . Speedy . . . Powerful. Has many uses around the home . . . in the shop . . . on the farm. Built to Last. Full ¼" Capacity.

DRILL STANDS *Add Many Uses for Zephyr Drill*

Horizontal Drill Stand— for Polishing, Buffing, Grinding, etc.

Price $1.00

De Luxe Electric Work Saver Kit

Adjustable Vertical Drill Stand— for drill press operations

Price $10.95

Includes above ZEPHYR Drill, plus 28 accessories for buffing, cleaning, drilling, grinding, mixing paint, polishing, sanding, sharpening, waxing, and wire brushing.

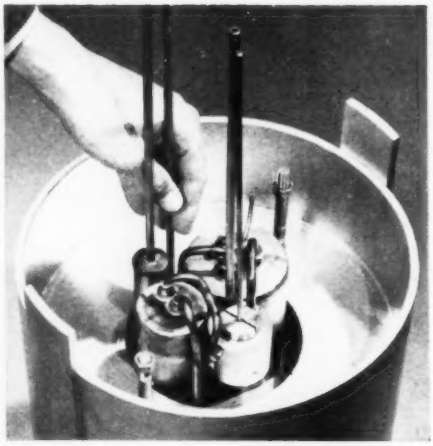
Price $27.35

At Hardware, Implement, and Building Materials Dealers, and Department Stores—or Write Direct

PET TOOLS — PORTABLE ELECTRIC TOOLS, INC.
326 West 83rd Street, Chicago 20, Illinois

In Canada: Portable Electric Tools, Ltd., Toronto, Ont.

Plug in—Get "Hot" Iodine



By simply plugging in a portable gadget that looks like a fireless cooker, a doctor will be able to get radioactive iodine whenever he wants it. Formerly, such isotopes, valuable in medicine and research, could be made only in atomic piles.

The "isotope generator" (shown above) yields iodine 132, so short-lived (it has a half life of less than 2½ hours) that it could never be shipped to hospitals from distant reactors. As a substitute, doctors used iodine 131, a longer-lived but less desirable variety. Now the generator, developed at Brookhaven, will offer the highly perishable iodine 132 on tap right at a patient's bedside.

The generator contains tellurium 132, a relatively long-lived isotope that is continuously changing into iodine 132 during and after delivery to a hospital. A built-in electric heater, plugged in by the user, warms the iodine 132 that has formed and drives it out through a delivery tube.

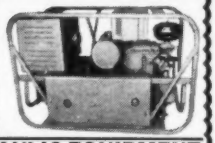
Helps Thyroid Studies

Radioiodine is especially useful in studying the thyroid gland. The gland picks up iodine from the blood stream, and knowing its rate of absorption permits detecting its disorders, including thyroid cancer. Years ago, surgeons had to operate to obtain a slice of thyroid tissue for chemical analysis. Today they merely administer radioactive iodine and train a Geiger counter on the patient's Adam's apple.

GROBAN'S BRAND NEW UNCONDITIONALLY GUARANTEED WAR SURPLUS BARGAIN SPECIALS

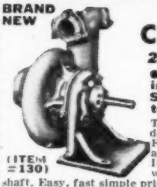
GENERATING PLANTS

IMMEDIATE DELIVERY. LARGE STOCK. MANY SIZES FROM 350 WATTS TO 25 KVA



Item #347—PE-201—1000 Watts—120 Volts—60 Cycle AC—Single Phase, and .3 KVA. 14.6 Volts-20 Amps. DC for battery charging. Model A. Leland Generator, belt driven by a Briggs & Stratton 1 cylinder air cooled, 2.7 HP gas engine at 1800 RPM. Control panel contains DC voltmeter, ammeter, rheostat, receptacle and terminals. Also AC frequency meter, rheostat, 120 volt double receptacle and terminals. Overall dimensions, 36"x 19"x24". Ship. wt. 250 lbs. F.O.B. Chicago..... **225.00**

BRAND NEW



(ITEM #130)

General Motors—Allison CENTRIFUGAL PUMP

200 GALLONS PER MINUTE

● For Draining Basements ● Fire-Fighting ● Irrigation ● Fuel Transfer ● Swimming Pools ● Home Water Systems ● Dewatering

This General Motors-Allison Centrifugal Pump—designed for use on U.S. Air Force Mustang Fighters, now converted for commercial, home, and industrial high volume pumping applications. Inlet, 2½" standard pipe thread, twin outlets with 1½" pipe thread, ball bearing supported ¾" shaft. Easy, fast simple priming. Rotation, counterclockwise facing shaft. Shipping wt. 35 lbs. Gov't acq. cost $145.00. F.O.B. Chicago. **NOW ONLY**..... **39.50**

Aircraft Quality HYDRAULIC EQUIPMENT

ITEM #160—PESCO GEAR TYPE HYDRAULIC PUMP—Compact—Powerful—Reliable. Especially designed for belt drive from fan belt, power take-off, drive pulley, electric motor or small gas engine. Equally suitable for direct coupling. Pedestal type mounting with two bolt holes for ⅜" hold-down bolts. Standard ½" pipe thread inlet and outlet ports. Delivers 4.5 GPM at 1000 PSI at 2800 RPM with 3 HP. Will actuate one Item #6, 3" bore, 24" stroke cylinder in 10 seconds. Hardened steel gears turn in dense oilite bronze bearings. Rotation—clockwise facing shaft. Guaranteed trouble-free service. Ship. wt. 6 lbs. F.O.B. Chicago. **22.50**

Item #126

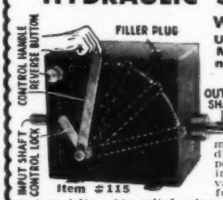
Item #160

ITEM #126—Four-way, open center control valve with built in adjustable relief valve. Factory set at 1000 P.S.I., spring loaded neutral position, for use with one double acting cylinder. In neutral position cylinder is locked and pump unloaded. Fully balanced plunger type, smooth, positive, easy operation, can be used as single unit or mounted in series of any combinations desired. Has ¾" pipe thread inlet and outlet, ½" pipe thread cylinder ports. Newly manufactured to our specifications. Shipping weight 8½ lbs. An outstanding Buy! F.O.B. Chicago..... **21.50**

ITEM #42—Double action hydraulic cylinder, 4" bore, 18" stroke, lift capacity with 1000 PSI line pressure is 12,500 lbs. Ship. wt. 30 lbs. F.O.B. Chicago. An Excellent Buy for... **32.50**

HYDRAULIC SPEED REDUCER

WITH FINGERTIP CONTROL



Item #115

USE FOR: ● Reamer Drives ● Midget Cars ● Feed Mills ● Canning Machines ● Conveyors ● Lathes ● Milling Machines ● Motor Boats ● Cream Separators ● Garden Tractors ● Pumps

Variable output speeds from 0 to input speed available by moving control handle. Locking handle maintains setting. Use input power of 1/4 to 1½ H.P. This Westinghouse-Oil Gear Unit consists of a variable displacement hydraulic unit feeding a fixed displacement hydraulic motor. Adjustable relief valves set at factory for 100 inch pounds of torque may be reset up to 180 inch pounds. Independent reverse control allows full output power and speed selection in either direction of rotation. Shafts measure ⅝" diam. include keyway. Input rotation is counterclockwise facing shaft. Recommended to speed not to exceed 750 R.P.M. Over-all dimensions, 7½"x7½"x 11½". Gov't. acquisition cost, $428.00. Ship. wt. 31 lbs. Complete with 2 qts. of oil and full instructions. F.O.B. Chicago..... **54.50**

NEW MODEL 353—DUAL RANGE

D. C. ARC WELDER

or Stationary or Portable Use. HEAVY DUTY RANGE TO 250 AMPS. NEW 'MAGIC TERMINAL' FOR LOW CURRENT 30 TO 100 AMPS. IDEAL FOR ● FARM ● FACTORY ● GARAGE ● WORKSHOP

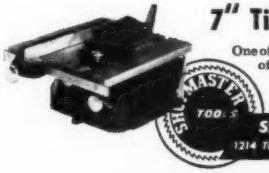
Welds Anything From Auto Fenders To Tractor Frames

These precision engineered D.C. Arc Welders contain the highest quality War Surplus aircraft components built to exacting government specifications. They are light in weight, have over-sized lifetime grease-sealed ball bearings, air cooled commutator, dial type rheostat for easy pin-point control, a high-low rheostat switch, reactor coil for even arc and the new 'MAGIC TERMINAL' low current welding range for welding lighter materials. Designed for many years of trouble-free service. Run welder from drive pulley or power take off of a tractor or Jeep. 7½ HP electric motor or 10 HP gas engine at 2500 R.P.M. Uses two V-belts or flat belt. Continuous output rating 200 amps. Intermittent welding rating 250 amps. 30 volts. This sensational price includes double V or flat belt pulley and complete operating instructions. Ship. wt. 107 lbs. $350.00 Value. **Item #65.** F.O.B. Chicago Now only **119.50**

ORDER DIRECT FROM AD—SEND PAYMENT OR PURCHASE ORDER TODAY—SATISFACTION GUARANTEED

FREE: 48-PAGE BARGAIN CATALOG. Write Today!

GROBAN SUPPLY CO. DEPT. PS-7
1139 SO. WABASH AVE., CHICAGO 5, ILL.



7" Tilting Arbor Saw

One of Shopmaster's complete line of quality-built tools at the remarkably low price of **47.95**
Slightly lower zone 1

SHOPMASTER TOOLS

SHOPMASTER, INC.
1214 Third St. S., Minneapolis, Minn.

HASTINGS
STEEL-VENT PISTON RINGS
The best money you can spend on your car

Build the Best! EASY TO ASSEMBLE BOAT KITS

NEW CATALOG

OVER 40 PAGES, INCLUDES ALL YOU NEED TO BUILD YOUR OWN
1 - BOAT KITS—30 MODELS
2 - MARINE HARDWARE
3 - MARINE ENGINES
4 - MARINE CONVERSIONS
5 - PAINTS & COLOR CHARTS

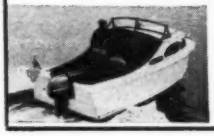
All For Only 35c, SEND COIN TODAY

ROWBOATS
8-10-12-14 FT.
$39 up

OUTBOARDS
8 Models 12 to 18 FT.

INBOARDS & CABIN CRUISERS
16 TO 23 FT.

NEW 18 FT. OUTBOARD CABIN CRUISER



FAST VEE BOTTOM HULL SPEEDS UP TO 25 M.P.H. — ROOMY CABIN, WITH TOILET, SLEEPS TWO —

U-MAK-IT PRODUCTS
703R-WHITTIER ST., Bronx 59, N. Y. City

Ground Radar Guides Night Photo Planes

By teaming up a repeating photoflash gun with a new kind of radar that keeps its finger on a plane in flight, the Air Force has worked out a precise scheme for photo-mapping enemy front lines at night.

The radar rides in a truck trailer—called a TADP, for Tactical Air Direction Post—that can be hauled right up to the front. Its beam "locks" onto the photo plane and traces its flight with a pointer that moves across a map of the area the plane is flying over. The ground controller then guides the pilot by voice radio and tells him when to start shooting pictures. The pilot doesn't need to see the ground or even know where he is.

AIRMAN LOADS FLASH CARTRIDGES into 50-barrel ejector in bomb bay of RB-26. They're packed with small, electrically fired ejection charge and 5¼ ounces of flash powder.

The Light of 50,000,000 Candles

He just flips a switch that starts a gun in the belly of his plane firing out flash cartridges at intervals of 2½ seconds. When each one is about 400 feet below and 900 feet behind the plane, it goes off with a 50,000,000-candlepower flash.

Half a second before each flash the camera shutter opens, and half a second after the flash it closes. The picture thus is snapped with an open shutter. But there's no blur: a motor hooked to the film magazine keeps the film moving across the back of the camera just enough to make up for the plane's forward speed.

Tried on Carolina Maneuvers

In the first tryout of this new night photo-mapping technique, at recent Army-Air Force maneuvers in North Carolina, three two-engine RB-26s of the 112th Tactical Reconnaissance Squadron mapped an area of four square miles in two hours' flying, despite occasional "enemy" jamming of their radios. Each plane, directed by radar 12 miles away, flew three passes over the area at 2,500 feet and 250 miles an hour.

The mission was completed after midnight. Soon after dawn 350 feet of film had been developed, 936 prints made, 104 photos fitted and pasted into a mosaic of the area, and the map delivered to Army ground commanders. END

Paper Made of Sugar Cane

Bagasse, the fibrous material left after juice is extracted from sugar cane, may become an important new material for papermaking. The proposed use would augment the supply of newsprint, a critical defense material.

Employing a new method, the U.S. Forest Products Laboratory at Madison, Wis., has successfully made bagasse paper comparable in quality to wood-pulp newsprint. The process, developed by a New York firm, is said to enable the product to compete with wood-pulp newsprint in price. Plans call for a $15,000,000 paper mill at Clewiston, Fla., to use bagasse from a large existing cane-sugar mill.

Currently, bagasse is used in making fiberboard for structural and insulating purposes.

B-36 Eats Up Aluminum

More than 50 tons of aluminum are used in just one B-36 bomber.

A "CLOUDBURST" in this 100-foot water tunnel proves the effectiveness of advanced methods of sealing against moisture, dust and drafts. Bodies move past high-pressure water jets that douse them from every angle. This is typical of the thoroughness with which all Chrysler Corporation cars are built.

A CAR'S BODY TELLS A LOT ABOUT A CAR'S REAL WORTH TO YOU

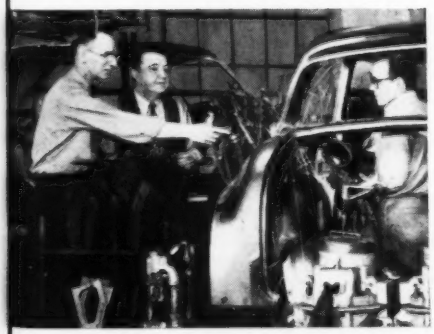
Chrysler Corporation engineers, stylists, and production men work together, so that body and chassis form a perfectly balanced unit — created from the start for your safety, comfort and *driving and handling ease.*

The way a door latches and holds . . . the amount of head and leg room you get . . . the comfort of the seats . . . breadth of vision . . . ease of getting in and out — all these are easily read guides to the worth of any car.

In a Plymouth, Dodge, De Soto or Chrysler, you get a superior body — and a superior chassis — engineered to give you the greatest worth for your money. You can prove this for yourself just by calling your nearby dealer and driving one of these great cars.

CHRYSLER CORPORATION engineers and builds **PLYMOUTH, DODGE, DE SOTO, CHRYSLER CARS & DODGE TRUCKS**

Chrysler Marine & Industrial Engines • **Oilite** Powdered Metal Products • **Mopar** Parts & Accessories
Airtemp Heating, Air Conditioning, Refrigeration • **Cycleweld** Cement Products



CHRYSLER CORPORATION ENGINEERS follow through each step in body construction. Here an engineer studies the double welding of a Dodge body, one of the many things that mean safer and quieter cars for you.

THE NEW C-200. Advanced body designs are created to learn practical applications of new concepts of style, comfort, fabrics and fittings, performance and safety. The Chrysler C-200 is the prototype of a dramatic new convertible.

For SMOOTHER MOTORING
INSIST ON
BOWES
SEAL FAST
DEPENDABLE
SPARK PLUGS
Here's Why—

★ Every Bowes Plug is Individually Tested—tested at higher voltage than is ever encountered in your car.

★ Oversize Special Alloy Electrode . . . welded construction assures positive connection.

★ Extra Large Ground Electrode assures longer life for plug.

★ Husky Aluminum Oxide Type Insulator assures against porosity—sure proof against shorting.

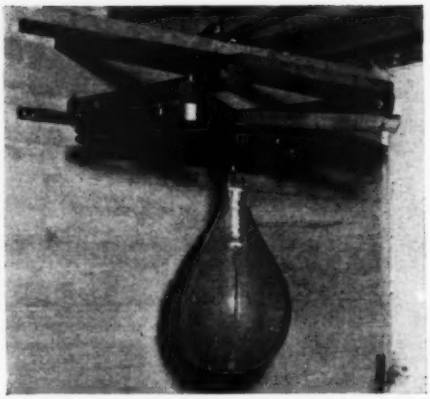
★ One-Piece, Leak-Proof Construction.

★ Patented Engine Gasket Retainer Ring assures better contact and better heat transfer.

BOWES PLUGS
are tailored to YOUR car's motor

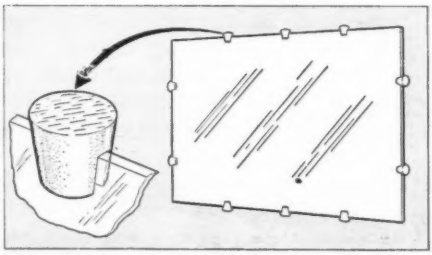
If your favorite SERVICE STATION does not handle Bowes Spark Plugs, write us direct for further information.

BOWES "SEAL FAST" CORPORATION
INDIANAPOLIS 7, INDIANA



Punching Bag Soft-Pedaled

When Junior starts slugging it out with an imaginary Dempsey or Louis, a punching bag mounted on the cellar joists can make an unholy racket upstairs. You can tone down your basement boxer without spoiling his fun by mounting the bag on a concrete wall. Drill the concrete with a star drill and use expansion bolts to fasten the frame to the wall.—*Grover Brinkman, Okawville, Ill.*



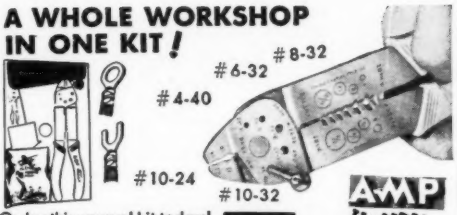
Corks Protect Glass Edges

Large sheets of glass or unframed mirrors often get damaged at the edges when stored on the floor leaning against a wall. Corks slotted with a sharp knife and placed at intervals around the glass will protect the edges.—*George Kapitan, The Bronx, N. Y.*

Plastic Ground Glass Is Unbreakable

You can make a ground glass for your camera from a sheet of 1/16" clear plastic. Rub one side with a damp cloth and a little scouring powder until you have a light but uniform satin finish. Not only will you have an unbreakable focusing surface, but I feel it produces a brighter image.—*Arthur Trauffer, McClelland, Iowa.*

A WHOLE WORKSHOP IN ONE KIT!



Order this unusual kit today! Gives you 5 tools in one that would cost from 3 to 5 times the price if bought separately. Multi-purpose tool shears 5 popular bolt sizes —no fuss—no burrs to file! Use it to cut wire, strip wire, and crimp solderless terminals. A supply of bolts, nuts, washers, and terminals included. Useful for hundreds of "handy man" jobs in home or workshop.

All for only **$4.95**

AMP HANDY DUTCHMAN

AIRCRAFT-MARINE PRODUCTS INC.
Dept. H.L. • 2100 Paxton St., Harrisburg, Pa.

FOR FASTER, EASIER SAWING—LONGER SAW LIFE—INSIST ON **ATKINS**

Silver Steel Saws

SOLD EVERYWHERE

ATKINS

BE YOUR OWN BOSS!!!

Make big money! Get ahead in something for yourself! Be a floor surfacing contractor and sand both new and old floors. No experience needed. High earnings, steady work with a future! Write for booklet "Opportunities in Floor Surfacing," enclosing 25 cents in coin or stamps to cover handling.

AMERICAN
FLOOR SURFACING MACHINE CO.
532 So. St. Clair Street • Toledo 3, Ohio

---

140 POWER . . . . .

Complete Telescope Lens Kit only **$2.95** postpaid

Conquer space. Explore the universe, planets, Moon craters, New stars. Complete lens kit consists of 54 inch focal length ground and polished objective lens, 140 power astronomical Eyepiece lenses, 100 power Eyepiece lens, 20x lens and all necessary lens fittings. Easily assembled from instructions. Money back Guaranteed.

BUSSE SALES COMPANY, Hartford 3, Conn. Dept. PS4

Cleaned in 30 seconds!

Here's the fast, *easy* way to clean your paint roller. Place roller cover in shaker can of IMPERIAL ROLLER CLEANER. Shake for 30 seconds and the roller cover is completely cleaned! Liquid cleaner may be used over and over again. Use it, also, for brushes. Safe for roller covers, brush bristles and your hands. At your dealer's.

IMPERIAL Roller Cleaner

Write for literature

Wilson-Imperial Co., 121 Chestnut Street, Newark 5, N. J.

EXPAND YOUR HOME!

USE YOUR ATTIC

Install the PRECISION Folding Stairway at a cost of $60 to $75

Equipped with *Roller Bearings*

Makes your home more livable by providing extra rooms and storage space in the most economical way. Fits all ceilings—Just saw a 26x54 inch hole in your ceiling, frame the hole with 2x6's, nail the stairway in place and cut off at the calibrated ceiling height.

SIMPLE AND EASY TO OPERATE—A slight pull of the cord and the counter weights that operate on factory packed roller bearings silently ease the stairway into down position. The same counter weights return the stairway to its up position with equal ease. RUGGED AND STRONG—Construction of No. 1 kiln dried poplar. Brackets, rocker arms and hinges of heavy cast aluminum alloy. All parts numbered and interchangeable. Panel insulated and protected with tough chip board. Steps covered with safety treads. FITS ANY CEILING—from 7 feet to 10 feet 3 inches high. Runners graduated to facilitate cutting off for different ceiling heights. REQUIRES NO ATTIC SPACE—Full height above attic floor only 36". Folds completely into opening in ceiling. SHIPPED IN ONE PACKAGE—Each stairway thoroughly inspected, assembled and ready to install. Shipping weight 130 pounds. Sold by more than 12,000 dealers in U.S.A. and Canada. ACCEPTED BY F.H.A. EVERYWHERE. Mail coupon TODAY for descriptive folder and complete information concerning delivery, prices and installation.

TO MAKE YOUR HOME MORE LIVABLE, Mail This Coupon today!

PRECISION PARTS CORPORATION
402 North First Street, Nashville 7, Tenn. PS

Please send me FREE folder and complete information on PRECISION folding stairways.

Name_____

Address_____

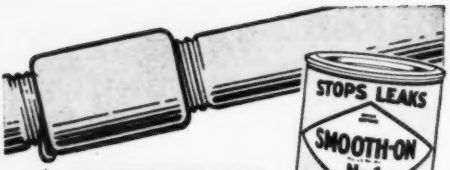
MAKE YOUR OWN POWER LAWN MOWER **$12.95**

with this DRIVE CUTTER ASSEMBLY

Constructed for those who desire to build their own mower or to replace your old cutter assembly. Complete with 18" blade and double ball bearing drive . . . . . .

Add 50c to cover handling & shipping.
Send check or M. O.

ATLAS KEEN MOWER
229 S.W. BLVD. Dept. PS-7 KANSAS CITY, MO



STOP PIPE LEAKS

with Smooth-On No. 1 Iron Cement. For over 50 years a home repair stand-by for stopping steam, water, oil and gas leaks in boilers, furnaces, tanks, stoves, etc. and for tightening loose parts. Get a 1¾ oz., 7 oz., 1 lb. or larger size at your hardware store and keep it handy.

FREE **40-PAGE REPAIR HANDBOOK**

Shows many useful repairs you can easily make around the house and on the car. 170 pictures. Write NOW for free copy.

SMOOTH-ON MFG. CO., DEPT. 58 G
570 Communipaw Ave., Jersey City 4, N.J.

SO 362

Do it with SMOOTH-ON

THE IRON CEMENT OF MANY USES

A REAL DRILL PRESS

COMPARE capacity, quality. 5-in-1 SHOPSMITH drills to center of 15" circle. Full 27" chuck to table. Converts to saw, sander, lathe, horizontal drill. Write for free catalog.

SHOPSMITH, Dept. 286-A
12819 COIT ROAD, CLEVELAND 8, OHIO

EVERY ¼" ELECTRIC DRILL A PORTABLE SAW IN ONE MINUTE!

NEW! No. 445 "ARCO-SAW" for DEPTH & BEVEL CUTS

At Better Hardware Stores Everywhere

11.50 with all GAGES & 4" "HYCARBON" Crosscut Blade.

No. 444 "ARCO-SAW", same as above—less gages. Has accurate visual guide.... **9.95**

No. 444G Depth-Bevel-Rip Gage. Easily attaches to any No. 444 "ARCO-SAW"..... **1.95**

Extra "HYCARBON" Blades. 4" Crosscut or 4" Combination **1.60**

CAN BE USED WITH ONE HAND! "ARCO-SAW" works like a high priced Portable Saw. RIGHT ANGLE GEAR DRIVE eliminates clumsy, dangerous direct drive with drill sideways.

CUTS 1-1/4" or 2x4 by turning over

CHECK THESE EXPENSIVE FEATURES:
Depth gage graduated from 0 to 1¼" depth (for grooves, dados), **Bevel gage** graduated from 0 to 45° angle (for dovetails, bevels), **Rip gage** with sideways adjustment. **Visual guide** with adjustment to follow lines on both straight and bevel cutting. **90-DAY FACTORY GUARANTEE.**

UNCONDITIONAL 10-DAY MONEY BACK GUARANTEE

OVER 100,000 SOLD ARCO SAW

ORDER TODAY at your dealer or send us check or M.O. (Postpaid), C.O.D.'s—postage extra.

DEALERS — Write for nearest jobber.

ARROW METAL PRODUCTS CO
Dept. PS-7, 140 West Broadway, N. Y. 13, N. Y.

10% MORE BUILT-IN POWER!

U. S. Testing Laboratory report proves Burgess Flashlight Batteries contain more active ingredients than two other leading brands. Selected best quality materials guarantee longer-lasting bright light. Buy BURGESS at better dealers everywhere. Burgess Battery Company, Freeport, Illinois—Niagara Falls, Canada.

SEALED IN STEEL and Plastic

BURGESS FLASHLIGHT BATTERIES

NOW-FIXIN' IS FUN!

SAVES REPAIR BILLS TOO!

LOCKS with TON-GRIP

Model 10-W $2.60

VISE-GRIP WRENCH

Be your own serviceman, plumber, electrician! VISE-GRIP Makes You Handy! LOCKS to work, can't slip. Holds, pulls, turns, twists. Locking wrench, super-pliers, hand-vise—ALL IN ONE! 7" and 10", with or without cutter. Only $1.85 to $2.60 at your dealer.

PETERSEN MFG. CO., DEPT. M-7, DEWITT, NEBR.

WOODCARVING and WHITTLING

AN ARTISTIC HOBBY FOR ALL

This new manual shows you how to do every kind of wood carving. How to carve jewel boxes, picture frames, trays, chests, furniture, etc. How to do chip carving, level surface carving, incising, carving in relief. Carving human and animal figures in the round completely explained and simplified. 256 Pages. Fully illustrated,—full cloth bound. Send only $2.00 and your copy will be sent postpaid, or order COD plus postage if you wish.

Money back if not satisfied.

Popular Science Monthly — Dept. 752
353-4th Ave. New York, N. Y.

Wonders Through The MICROSCOPE

A new book which tells you all about MICROSCOPY. Turn an inexpensive microscope on hundreds of specimens within a stone's throw of your front door and you step off into a new world of wonders. Complete manual for amateurs. How to use equipment, secure and preserve specimens, take photomicrographs, etc. Numerous illustrations. Full cloth bound, $1.49.

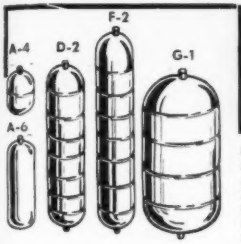
Popular Science Monthly, Dept. 752, 353 4th Ave., New York 10, N. Y.

LUXURIOUS CONTOUR CHAIR BUILD IN ONE EVENING

If you can use a hammer, you can build this smart, comfortable, scientifically correct chair in a few hours. All parts furnished in complete kit. Genuine "Duran" plastic upholstery, four colors—red, blue, green or brown. Modern, healthful, relaxing, for porch or living room. Send order, with choice of color, $5 check or money order, balance C.O.D. Money back guarantee.

Complete Kit **$24.95**

BESTE CRAFT CO., BOX 3701, BALTIMORE 14, MD. f.o.b. Baltimore



STEEL AIR TANKS

Steel pressure tanks suitable for compressors, pneumatic units, gases, hydraulics, and **liquids. Rated at 500 lbs.** per square inch pressure. ¼" standard pipe thread openings on tank ends as shown.

		Size	Wt. Lbs.	Internal Volume	Price
A-4	Stainless Steel—New	7½"x5¼"	1½	104 cu. in.	$1.50
A-6	Carbon Steel —New	14½"x5½"	3¼	280 cu. in.	3.50
D-2	Stainless Steel—New	24"x6"	5	500 cu. in.	5.50
D-2A	Carbon Steel —New	24"x6"	5	500 cu. in.	4.50
F-2	Stainless Steel—New	45"x6"	11	1000 cu. in.	9.50
F-2A	Carbon Steel —New	45"x6"	11	1000 cu. in.	5.50
G-1	Stainless Steel—New	24"x12"	18	2100 cu. in.	11.50
G-1A	Stainless Steel—Used	24"x12"	18	2100 cu. in.	9.50

Prices F.O.B. Chicago. Include approx. postage on orders paid for in advance. C.O.D. orders enclose 25%, balance sent C.O.D.

U. A. S. Corp. Dept. PS-7 5637 W. 63rd Pl. Chicago, Ill.

AMAZING NEW SAFE SAW
MOST POWERFUL OF ITS KIND!

CUTS 1" SOFT WOOD, thin metal, plastic. New "201" Syncro QUIET for apartment use. SAFE for kids. POWERFUL for Dad's use. Any length cuts. Stroke adjustable. Portable. COMPLETE with BUILT-IN Motor. $24.95 at dealers or postpaid. Write for FREE circular today.

SYNCRO ELECTRIC JIG SAW

SYNCRO Corporation, Dept. G-72, Oxford, Michigan

INVENTORS

If you have working models, blue prints, or patents, covering "special use" parts or assemblies for Chevrolet, Ford, or Plymouth Cars, it will be to your advantage to get in touch with us. Write us at the factory. Dept. PS

NATIONAL MACHINE WORKS, INC.
P. O. BOX 4305 AUTOMOTIVE PARTS MANUFACTURERS OKLAHOMA CITY 9, OKLA.

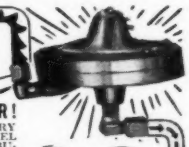
SPECIAL OFFER—Only 10¢
50-Page "Tools and Rules" Book

"The Tools and Rules for Precision Measuring" tells how to make accuracy a habit, shows the methods skilled mechanics use. 100 pictures plus reference tables. Send only one dime. Address Dept. PS.

Only 10¢

THE L. S. STARRETT CO. • ATHOL, MASS., U. S. A.

SAVE GAS
WITH A
FUEL PRESSURE REGULATOR!



THIS REVOLUTIONARY NEW ACCESSORY STOPS GAS WASTE CAUSED BY FUEL PUMP PULSATION. ELIMINATES CARBURETOR FLOODING AND FUEL "SURGE." STOPS THE ANNOYANCE AND POWER LOSS CAUSED BY "MOTOR CUT-OUT." Many users claim up to 25% gas saved. Regulator s-m-o-o-t-h-s fuel flow...prevents vapor lock and percolating. It pays for itself in a few weeks with gas saved, by eliminating frequent carburetor tuning and by reducing engine and carburetor wear. Fits all cars and trucks.

BEFORE AFTER
only $5.95 postpaid
(or send $1, balance COD)

3 BOOKS FREE! With each order: Big "Speed Equipment Catalog" plus "Economy Driving Manual" plus famous "150 Miles Per Gallon Book"—a regular $1.75 value free with order.

NEWHOUSE AUTOMOTIVE INDUSTRIES
Dept. AR-7, 5805 E. Beverly Blvd., Los Angeles 22, Calif.

ONLY $32.50 LESS MOTOR

Favorite of home owners and craftsmen for 20 years! SPEEDY SPRAYER gives your work that professional paint finish everyone admires. Sprays paint, enamel, varnish, lacquer, etc. . . . 4 to 7 times faster than hand brushing! Lightweight, portable, uses any ¼ H.P. motor. Improved diaphragm principle assures clean, oil-free air. You'll find dozens of time and money saving uses for SPEEDY SPRAYER, including spraying insecticides 2-4-D and DDT. Complete outfit, without motor, only $32.50.

At leading hardware, lumber, and auto supply dealers.
FREE—*write for handy booklet "How to Spray."*

W. R. BROWN CORPORATION
2637 N. Normandy Ave. • Chicago 39, Ill.

MAKE MONEY FAST
IN ONLY SPARE TIME - SHOWING CAR OWNERS SENSATIONAL NEW
Auto Seat Covers
including
BLACK EBONY
AMERICA'S NEWEST SEAT COVER SENSATION

EVERY CAR OWNER A PROSPECT

Want extra money—*plenty of it* day after day? Then rush your name and address at once Free Sample Outfit that will start you taking orders from car owners everywhere for Key expertly tailored Auto Seat Covers. Show EXCLUSIVE NEW PATTERNS to fit every make and model car. No one can compete with you in wide choice, in quality—and in expert tailoring that makes covers fit like a pair of gloves! And when you quote prices that are only a fraction of what the customer expects to pay, brother! You make money hand over fist writing up the first orders! Line includes nationally advertised sensations like BLACK EBONY Saran, beautiful BAMBOO, brilliant FIESTA, colorful BULL FIGHTER PLAIDS, plus many other exclusive patterns to choose from.

RUSH NAME FOR FREE OUTFIT
GIVE MAKE, YEAR AND MODEL OF YOUR CAR

No experience needed. Make all the extra money you need easily just by *showing!* Every car owner a "hot" prospect. YEAR AROUND STEADY PROFITS. No investment to make. *Actual seat covers given to producers for OWN USE!* Write for Free Selling Kit and actual samples TODAY!

KEY PRODUCTS CORP., Dept. 67
800 N. Clark St., Chicago 10, Illinois

WAR SURPLUS BARGAINS

HOT ROD SUPERCHARGER

Extra soup and go at a price you can't afford to miss! Mfr'd by Borg-Warner. Specifications: 7½" deep, 7" high. Wgt. 17 lbs. Compact and sturdy. 4 base mounting holes, 3¼" outlet, ⅝" shaft with female Lovejoy coupling. Priced today at $85. Our special SALE PRICE **$31.00**

ALARM HORNS
and Sirens. 110 v. AC motor driven. Heavy duty with long life and adjustable tone high, med. and low. List $47. NEW **$19.95**

BRASS HAND PUMP. Double acting pumps on forward and return strokes. Capacity 1000 gal. per hr. $48 value, only **$18.50**

LIGHT PLANTS

300 Watt 110-220 volt AC. Wgt. 40 lbs—portable **$99.**
750-1000 Watt. 110 v. AC. Briggs & Str'n eng. **$169.**
1000-1200 Watt 110 v. AC. only **$194**
2500-3000 Watt 110 v. AC. Slow speed (1800 r.p.m.) Leland generator for longer life. Recond'nd and fully guaranteed $295. NEW **$345.**
Plants built in 1951 with tools and spare parts. **$426.**
3000 Watt 120 v. AC. 4 cyl. gas engine. Hobart generator. List today **$1910.00.** Used $675.00. NEW, only **$895.00.**

WINCHES

1,000 lb. cap. Hand oper. **$12.95**
Hand operated ball-bearing model, 1500 lb. cap. 3-1 ratio, hand brake, 2 speeds **$39.50**
6,000 lb. double drum. Hand operated **$49.50**
1500 lb. electric drive **$108.50**
6000 lb. electric drive... **$188.50**
Single drum, ¾ HP motor 110 or 220 AC. Start-stop-reverse switch, belt pulleys & loose steel cable. Ratio 12-1. NEW **$125.00**
Double drum model **$135.00**

RUBBER HOSE

GOODRICH 2 ply 2" I.D. 25 ft. lengths worth $25 Only **$4.95.** 3 lengths for $12.00.

Write today for free catalog. **Thousands** of $$ saving buys.

C&H ELECTRIC MACHINE Co. Inc.
438H W Juneau Ave., Milwaukee 3, Wisconsin

FANS! FANS!
ALL TYPES — ALL SIZES

MAKE YOUR OWN ATTIC FAN

with patented Torrington belt drive factory balanced blades, the finest money can buy. Shipped knocked down. Assemble in 10 minutes.

BLADE DIA.	C.F.M.	R.P.M.	H.P. REQ.	PRICE
24	5560	625	¼	$12.75
30	7125	425	¼	14.75
36	10100	370	⅓	16.95
42	12500	295	½	19.95
48	16300	260	½	21.95

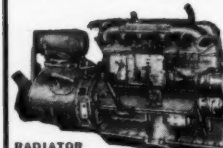
Reconditioned G. E. ¼ H.P. Rubber Mount Motor $9.75

Kitchen Ventilators, Exhaust Fans, Attic Fans, Blowers, Heat Boosters, Desk Fans, Window Fans, Blades, Guards, Shutters, Motors, etc.
Free illustrated catalogue, dealers inquiries invited

EDWARDS BROS. ESTAB. 20 YEARS

WESTERN APPLIANCE CO., INC.
5650 Grand River Ave., Dept. S, Detroit 8, Mich.

65 KW. 225 Volt D.C. DIESEL ELECTRIC GENERATING UNIT



RECONDITIONED
Equipped with 6 cyl. DRXC Hercules DIESEL engine. 4⅝" bore, 5¼" stroke. 133 H.P. at 2000 R.P.M. Complete with injector pump, nozzles and electrical equipment. Generator attached to engine. Complete as shown.

RADIATOR for above unit..... $89.50

Ea. $1375.00 Lots of 2 ea..... **$1295.00**

Write for price on DIESEL ENGINE only.

1952 EDITION
It's NEW! Get the world's largest Auto Accessory & Parts Catalog & Save money. Over 50,000 items. Including Hollywood Accessories. Hi-Speed Equipment. Rebuilt Engines, all parts & accessories for all cars and trucks. We have that Hard-to-Get part. Completely illustrated, 100 pages. Send 25c (refundable)

FOR GAS, OIL, WATER. NEW 5 GAL. CANS
- Self locking cap.
- Compact in size.
- Sturdily made.
- Floats when full.
- 3 bar strong handle.

18" High, 6¼" thick, 13" wide.
Ea., $2.95 Lots 5, or more ea. **$2.49**

SEND 25% CASH WITH ORDER, BALANCE C.O.D.

J. C. WHITNEY & CO.
1917BY ARCHER AVE. CHICAGO 16, ILL.

FILE SAWS THE RIGHT WAY

SO EASY to joint and file saws like new 2 hardened steel rollers keep teeth same height All teeth cut, saw runs true and smooth **$2.95**

GRIND all circle saws 6 to 10 with correct beveled wheel Fits your saw table **$8.95**

SUPER DRILL GRINDER
Sharpens round shank drills 3/32 to ½" 6" long Grinds old drills like new in 4 different point angles, using hand power grinders **$2.95**
At dealers or postpaid
FREE FOLDERS

TRU-CIRCLE Saw Set — Automatically sets teeth 10° or more **$2.95**

A. D. McBURNEY 317 E 4th St., Los Angeles 14 Calif Dept S-19

$750 BUILDS 4 ROOMS & BATH!
WHY PAY RENT?

For Seven Hundred Fifty Dollars and 30 days of your spare time, you can build yourself this Beautiful Home. Living room 11x15. Front Bedroom 9x11. Back bedroom 10x12. Kitchen 9x11. Bath 5x8. Hall 3x4. Wind out steel Casement windows. Concrete block, stuccoed. $1.00 brings you Step-by-Step Instructions, Blueprint & Material List.
L. H. FARROW, Dept. D
Box 645 Columbus 16, Ohio

ONE-MAN SAWMILL
LOW AS $50.00 DOWN

Take BELSAW Portable Sawmill right to the trees—turn out valuable lumber for local yards—do "custom sawing" for neighbors. BELSAW lasts a lifetime. No crew needed. Power with old auto engine. Beginners get excellent results. Send postcard for FREE BOOK, "How To Make Lumber."

FREE BOOK

BELSAW MACHINERY CO
8464 Field Bldg. Kansas City 2, Mo.

DRAINS Cellars, Laundry Tubs;
CIRCULATES Oil; IRRIGATES Gardens

Original "Type P" Pump has 2400 GPH capacity, 360 GPH 75' high, or 1500 GPH from 25' well. Use any ⅛ to ½ HP motor. DOES NOT CLOG. 1" intake; ¾" outlet.
Only $6.95 postpaid if cash with order (West of Mississippi, add 50c.) **$6.95**
MONEY BACK GUARANTEE!
Motor coupling included.
Also Gear Pumps in all sizes.

LABAWCO PUMPS, BELLE MEAD 3, N. J.

GET DRILL PRESS ACCURACY WITH ANY ELECTRIC HAND DRILL

You can drill a straight, perpendicular hole with any electric hand drill using a Jedco Drill Aligner. Give your electric hand drill the precision of a drill press. Sent complete with precision bushing holder, 5 hardened steel drill bushings for 1/8-5/32-3/16-7/32-¼ drills. Full price only $2.95 postpaid. Money back guarantee.

J. E. DUNNING COMPANY
Dept. PS-2
14547 Madison Ave., Cleveland 7, Ohio

WELD BRAZE, SOLDER, and CUT →

ONLY $14.75 F.O.B. complete!

No experience needed. Follow simple instructions, weld on iron, steel, bronze, brass, aluminum, and other metals. Plugs into any properly wired 110 volt A.C. or D.C. line. Make or save time and money doing repair work for yourself and others. Repair men, farmers, tinsmiths, home and auto owners, hobbyists, etc., say FOUR-WAY pays for itself over and over. Order today or send for Free details.

ORDER NOW 10 DAY TRIAL

FOUR-WAY WELDER COMPANY, Dept. F3-GC
2326 So. Michigan Ave. • Chicago 16, Illinois

LARGER EQUIPMENT AVAILABLE ON REQUEST

MODERN
LAWN MOWER SHARPENER

Service departments of leading Lawn Mower manufacturers use the Modern Lawn Mower Sharpener. One lever moves lawn mower into grinding position. Gasoline and oil remain in engine while sharpening, no dismantling of wheels, roller or handle. The Modern is a precision bed knife grinder—no extra grinder to buy. Imitated but never equaled—Compare before you buy.

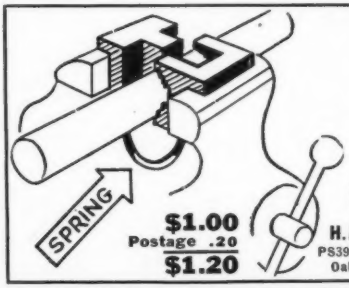
If it isn't a Modern it can't be Modern

(Prices subject to change without notice)

WRITE FOR FREE BOOKLET 11D

$263.00 with motor F.O.B. PASADENA

MODERN MFG. CO.
160 N. Fair Oaks - Pasadena 1, Calif.

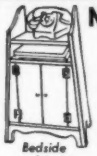


ROUND STOCK OR PIPE JAW
For Your Vise

$1.00
Postage .20
$1.20

H. A. JOHNSON
PS3921 LaCresta Ave.
Oakland 2, Cal.

THE ONLY SPARK PLUG WITH PATENTED CORALOX INSULATOR



Bedside cabinet

NEW! EARLY AMERICAN DESIGNS
Series C—15 plans 25¢

Colonial adaptations. Fun to make — easy to follow. Each project comes complete with photo and working drawing on 8½ x 11 sheet. Send 25c to: Stanley Tools, 472A Elm Street, New Britain, Connecticut. In Canada: Stanley Tool Co. of Canada Ltd., 472A Stanley Street, Roxton Pond, Quebec.

STANLEY
Reg. U.S. Pat. Off.

WANT TO **SAVE GAS?** ½ MILLION NOW USE GANES

AMAZING **GANE NEEDLE** | TRY ONE **FREE** IN YOUR CAR!

TRY BEFORE YOU BUY!

MANY GANE NEEDLE USERS REPORT UP to 25% more mileage, faster pickup, easier starting and smoother idling.

NOW TEST A GANE NEEDLE IN YOUR CAR for ten days, then compare your mileage and performance. If satisfied, send $1.50 per needle (8 cyl. cars take 2). If not satisfied, just return it—fair enough? Since authorities differ on its merits and some users report no improvement, TRY BEFORE YOU BUY! (Gane Needle replaces idling adjustment screw in carburetors—easily installed in a few minutes.)

FREE Auto Economy Manual
Tells how to save gas, tires, brakes, etc. Also introduces many new economy products. (Sent absolutely free to all who try Gane Needles.)

WRITE TODAY. ENCLOSE NO MONEY. PAY POSTMAN NOTHING.
Just send us your name, address, and make and year of car.
NATIONAL AUTOMOTIVE RETAIL CORP., Dept. H-7
350 W. Washington Blvd. Venice, California

MAKE OLD FURNITURE *NEW AGAIN*
ARCHER *Pol-mer-ik*
100% PURE LINSEED OIL

FREE BOOK
Refinish, beautify, polish all woods. "101 Handy Hints." Send for today.

ARCHER • DANIELS • MIDLAND CO.
603 Roanoke Building, Minneapolis 2, Minn.

FREE! SOUTH BEND CATALOGS
- 9" to 16" SWING LATHES
- 14" DRILL PRESSES
- 7" BENCH SHAPER
- ATTACHMENTS

Write today—check catalog wanted

SOUTH BEND LATHE WORKS
425 E. Madison St., South Bend 22, Ind.

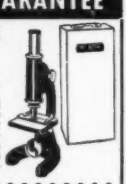
"TESTED AND TRIED" FOR A SMOOTHER RIDE!

Your car *never* gets sluggish with a can of Marvel Mystery Oil in the crankcase or gas tank. Marvel peps up the motor...eliminates hydraulic valve clatter...adds years to the life of your engine. Power zooms through for more miles per gallon in all kinds of weather.

MARVEL MYSTERY OIL
use in any top cylinder oiler

10 DAY MONEY BACK GUARANTEE

300 POWER IMPORT
MICROSCOPE
ACHROMATIC LENSES **$11.95** Postpaid



Precision instrument! Invaluable for study in Biology, Botany, and Zoology! Acclaimed by hobbyists, students, and professors. Achromatic eyepiece and objective lenses assure clear, sharp image, free from undesirable aberrations. Delicate focusing adjustment, full 90° body tilt adjustment, adjustable plano substage mirror, solid construction throughout. Here's the value of a lifetime, at a price anyone can afford! Complete with wood carrying case. $11.95 Postpaid.

IMPORTED 6x15
COATED PRISM BINOCULARS
WITH LEATHER CASE

$17.95 plus 20% tax — Shipped postpaid

Featherlight, fits palm of hand! Outperforms others many times its price by utilizing ultra precise prisms. Coated optics offer bright, clear images. Individual micromatic ocular lenses for accurate instant focusing. Dust proof, moisture proof, all metal modern construction, gleaming chrome finish. All purpose instrument for sport events, theater, traveling, nature study, etc. Linear field of view 438 ft. at 1000 yds. Complete with leather, velvet lined, zipper case. $17.95 plus 20% tax. Shipped postpaid.

NOTE: 10 day money back guarantee on all items. Send check, cash or M.O. (Illinois residents add 2% state tax. 1/3 deposit on C.O.D. orders)

Sub-Miniature CAMERA $3.00

Takes Needle Sharp Shots

Unique! Vest pocket size! Always handy for unexpected prize winning shots! Fine 20mm f/4.5 lens; shutter settings 1/25 sec. and B.; uses special daylight loading rolls, 10 exposures, 14x14mm. Built-in eye level finder, leather over metal construction, wt. 83 gr. Yours, with roll of film Free of extra cost. $3.00 P.Pd.

Precision Engineered 20X TELESCOPE $9.95

Would sell in stores for 3 times our price! Optically ground, coated achromatic lenses give you 400X the area magnification. All metal construction resistant to rust and salt spray. Extends to 13½", telescopes to 6¾" pocket size. A necessity for boat owners, ideally suited for astronomical studies, hunting, observing races, sporting events. $9.95 Postpaid.

40X POCKET MICROSCOPE
$3.95 P.Pd.

Compact, clips into pocket, always handy. Examine insects, minerals, gems, etchings, stamps, anything—anytime! Fine 4 lens compound optical system. Comes ready to use, always in focus for pin point sharpness, no adjustments necessary. $3.95 P.Pd

LEMAR SCIENTIFIC CORP. Dept. E7
3412 W. JACKSON BOULEVARD, CHICAGO 24, ILL.

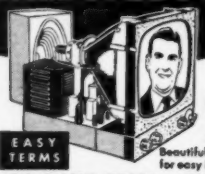
WHAM-O SPORTSMAN *

$1.50 POSTPAID — 35-LB. PULL!

HITS LIKE A RIFLE—
KILLS RABBITS, SQUIRRELS.
Powerful, silent, accurate.
For hunting, target, routing pests.
Sportsman's choice sold world over!

HUNTING SLINGSHOT
Heavy duty 7" ash stock.
40 steel balls, extra rubber, target.
GUARANTEED. At dealers, or send $1.50 to
Wham-O Mfg. Co. Box 88, South Pasadena, Calif.
*** Professional model of Nat'l Slingshot Assn.**

Sensationally New For 1952!
MIDWEST Television
and 5 Wave Band **Radios**



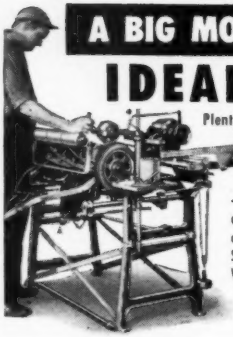
Mammoth **20-INCH** Rectangular PICTURE
Beautiful consoles and complete chassis for easy installation in your own cabinet.

EASY TERMS

30 DAYS TRIAL—FACTORY-TO-YOU

SEND THIS COUPON For FREE MIDWEST 1952 Catalog

MIDWEST RADIO & TELEVISION CORP.
Dept. 24R, 909 Broadway, Cincinnati 2, Ohio
NAME _____
ADDRESS _____
CITY _____ ZONE _____ STATE _____



A BIG MONEY-MAKER
IDEAL *Lawnmower Sharpener*

Plenty of business in your community—for a big, steady income! Cash in with the IDEAL Model 300—a rugged, precision sharpener, easy to use, backed by 50 years of experience. Sharpens all mowers. Start now, full time or spare time. Write for free catalog today.

THE FATE-ROOT-HEATH COMPANY
Dept. PS-7, Plymouth, Ohio

MOTORISTS—*Had your Oil Filter checked recently?*

If not, chances are it's choked up . . . can't keep up its engine-saving, money-saving work. It's high time for a

PUROLATOR Micronic* REFILL

(Costs as little as $1.60) *Reg. U. S. Pat. Off.

BUILD YOUR OWN FAN

One-piece cast aluminum propellers for cooling and ventilating.

Size Inches	Polished 2 Blade	Polished 3 Blade	Unpolished 2 Blade	Unpolished 3 Blade	Bore Inches
15	$3.00	$4.00	$2.50	$3.00	½, ⅝, ¾
18	3.75	5.00	3.00	4.00	½, ⅝, ¾
20	4.00	5.50	3.25	4.50	½, ⅝, ¾
24	4.50	6.50	4.00	5.50	½, ⅝, ¾

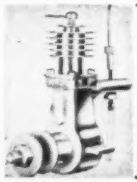
Write for pamphlet on larger fan blades, wire guards, fan bases, shutters, pillow blocks, exhaust fan frames, etc. Dealers write for discount.

KLOPPENBORG ALUMINUM FDY., Dept. PS-527, Davenport, Iowa

BUILD ARC WELDER FROM OLD GENERATOR
WE SHOW YOU HOW
Light or Heavy Work

Produces 75-200 amperes. Takes no previous experience or hard work to make one of these welders. Complete plans 35c. Send for your **PLANS** today and we'll include FREE our Big NEW Catalog listing hundreds of electrical bargains.

LEJAY MFG., 1323 LEJAY BLDG., MINNEAPOLIS, MINN.



Our 520th Advertisement
REAL DIESEL ENGINE
$2.95
- for planes, boats, midget cars
- 7500 RPM; 1/7 HP; ht. 3½"; wt. 5 oz.
- precision machined for smooth operation

You just can't beat this price for a precision diesel engine! Streamlined, compact, easy to install. Thousands of satisfied users all over the world. Fast delivery if you ORDER TODAY! Send $2.95 plus 25c postage.

Gotham Hobby Corp. Dept. S, 107 E. 126th St. New York 35, N.Y.

---

ask your dealer for
Red Devil
putty knives and wall scrapers

THE CRAFTSMAN'S WELL-TEMPERED FRIEND

RED DEVIL TOOLS, IRVINGTON 11, N. J., U. S. A.

GET MORE POWER!

Fisher's Compression SEAL

- **Stop Burning Oil!**
- **Restore Compression!**

$3.95 postpaid

A small amount of Fisher's Compression SEAL in each cylinder bore will give you the economies of smooth, powerful (new car) performance and reduced oil consumption. Only takes minutes to apply . . . yet adds 10.000 more miles of economical driving pleasure to your car. A $25.000 insurance policy is your assurance it cannot harm the finest engine.

SATISFACTION GUARANTEED

Full purchase price refunded, if not completely satisfied. Why pay more when you can get Fisher's Compression SEAL . . . **for less.** No oil solvent baths necessary! Send cash, check or M.O. today. Only $3.95 postpaid. Free Folder. **Dealers Inquire.**

ADVANCED ENGINEERING DEPT. PS-7, BOX 7013 LOS ANGELES 37, CALIF.

FREE Book on Painting

Get this illustrated 24-page book absolutely free. Full of facts on how to get better results with aluminum paint—which type to use for different jobs. Absolutely no obligation—just write:

ALUMINUM COMPANY OF AMERICA
1717-G GULF BLDG., PITTSBURGH 19, PA.

VARIABLE SPEED HYDRAULIC POWER TRANSMISSION

It has Infinite Speeds 0 to 550 Reverse Automatic Overload Protection; Adjustable Torque up to 180 inch pounds. ⅝" Input and Output Shafts. It will handle 1¼ to 1½ H.P. Motor. Case measures 7½" long 7" high 6½" wide. VALUE OVER $300. Shipping Wt. 25#. On C.O.D. Orders we require a 10% Deposit.

only **$54.50** Fob. Chicago

DIRZIUS MACHINE SHOP "P" 1423-25 So. 52nd Ave., Cicero 50, Ill.

SHIP MODEL KITS

Largest supply in New England. Fittings — Blueprints — Books. All prices. Write Dept. PS52. BIG ILLUSTRATED CATALOG 25c

JAMES BLISS & CO., INC.
342 Atlantic Ave., Boston 10, Mass.

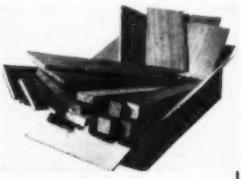
120 Years in Business

When Writing To Advertisers Please Mention Popular Science

Genuine Solid Mahogany

"HOBBY PAK"

ONLY **$4.95**



A $16-$18 retail value FOB Mill, Sunman, Ind.

Package includes: 4 turning squares 2"x2"x24" (THESE ALONE WORTH PRICE OF ENTIRE KIT). A variety of ¾" and 1" lumber 4" to 8" wide and 12" to 30" long, totalling 10 to 12 board feet. Box 31" long, 16" wide, 6" high. Weight Approx. 35 lbs.

Send check or money order to

BACON LUMBER CO., INC. 4704 Augusta Blvd. Chicago 51, Illinois

---

WAR SURPLUS AND OTHER BARGAINS SAVE UP TO 90%

LOW VOLTAGE CIRCUIT TESTER

Made for U. S. Ordnance Dept. to rigid specification. Portable steel hand-carrying unit is a self-contained trouble shooting device for making a complete & rapid check of the generator battery circuit, incl. any circuit & voltage regulators. Battery voltage, regulators, cut-out settings and generator performance easily determined. Terrific testing unit for garages, mechanics, truck fleet owners, boat and marine mechanics. Can be used on any 6 or 12 volt system. Approx. Govt. cost $175. NEW, complete with instruction book, only **$32.50.** Shpg. wt. 20 lbs.

"BALTIC" SWEDISH TOOLMAKERS VERNIER CALIPER

New low price due to lower import duty!

ULTRA PRECISION—0.6" in .001 graduations. Quick, accurate depth, inside, outside measurements, line engraving. Extra heavy rule, hand-fitted sliding head, no side play. Rockwell C.60, lapped measuring surfaces. For the extra particular mechanic who must have the best—used and recommended by most critical experimental & research machinists at Lockheed, Douglas, Bendix, GM, RCA, General Electric. Save 60%! A $37.50 value—only **$14.75,** leather case incl. Also a standard grade Mauser Design Caliper made in Germany. For the production machinist, 0-6" in thousandth. Money back guarantee. Only **$10.95,** leather case incl.

THOR PNEUMATIC SQUEEZE RIVETER

"C" Yoke Head. Size PRS-1. Model 4520. Shpg. Wt. 20 lbs. Approx. Govt. Cost $250. Like new—guaranteed perfect! Just -------- **$35.00.**

U.S. BAROMETRIC ALTIMETER

This U.S. Gauge Altimeter is terrific for auto or airplane. Tells altitude accurately . . . guaranteed. It's NEW! Approx. Govt. Cost $175. Cost from Airborne only **$9.95.**

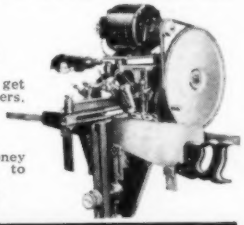
Send 25c for 1952 catalog. Bargains for everyone. Check, Money Order or Cash. 25% deposit on C.O.D. orders. Prices F.O.B. Culver City, Calif., unless otherwise stated.

AIRBORNE SALES CO., INC., Dept. PS752 8501 Stellar Dr. Culver City, Calif.

Make $20 to $30 a Week EXTRA MONEY!

With the high prices of food, clothing and everything else, just think what you could do with extra money every week! Turn your spare time into CASH—sharpening saws with a Foley Automatic Saw Filer pays up to $3 or $4 an hour. Start in your basement or garage—no experience necessary. "The first saw I sharpened with my Foley Filer came out 100%"—writes Clarence E. Parsons. No canvassing—"I advertised in our local paper and got in 93 saws"—says M. L. Thompson. With a Foley you can file all hand saws, also band and cross-cut circular saws.

FREE BOOK
Shows How to Start



It explains how you can get business from home owners, farmers, carpenters, schools, factories, etc. "I get work from 20 and 30 miles away"—says Charles H. Smith. Free Book, "Money Making Facts," tells how to start. Send coupon today—no salesman will call.

Send Coupon for FREE BOOK

FOLEY MFG. CO.
719-2 Foley Bldg., Minneapolis 18, Minnesota

Send FREE BOOK—"Money Making Facts."

Name . . . . . .

Address . . . . . .

Imagine! Owning Your Own RANCH HOUSE, CABIN or HIDEAWAY

by the Shore or in the Mountains

Amazing NEW Book Shows You How You Can Build Any of 27 Different Structures . . . . . for Mere Cost of Materials!

256 Pages, 207 Pictures, 23 Chapters!

"*How to Build Cabins and Ranch Houses*" will *slash* the cost of your new home! This one great book shows how you can build it yourself at *lowest possible cost* from the foundation to the roof. And it's EASY! Just choose your favorite from the loads of illustrations (complete with floor plans) whether it be cabin, lake cottage, modern ranch house, or mountain retreat. With the aid of this brand-new, money-saving book, you'll complete your house in *record time!*

SIMPLIFIED DETAILS

You don't need professional help when you start building your dream home. Here are simplified, detailed instructions on laying a foundation, building and caulking walls, constructing stairs, laying floor boards, estimating costs. Step-by-step plans on making windows, building fireplaces and chimneys, cutting doors, installing plumbing and lighting. You'll also find out how to beautify your cabin or ranch house, prevent wood decay, build rustic furniture, and speed up the building with many short cuts. Equip your house with all modern conveniences at a fraction of the usual cost!

SEND NO MONEY NOW!

Detach and mail coupon below, then pay postman the low, *bargain* price of $2.49, plus a few cents postage, when your book arrives. Examine this wonder-book with its 256 pages, 207 illustrations, and sturdy cloth binding for a *full week!* Then, if you don't agree that you'd pay twice as much ordinarily for such a big, jam-packed book, simply return it for refund with NO OBLIGATION! But, HURRY—get your copy while they last!

EXTRA!

Make *big* money by building for PROFIT! Valuable section shows you how to *build and sell* roadside stands, gas stations, colorful signboards and more! No complicated, expensive tools needed. This one section *alone* makes this the "Big Opportunity" book of your lifetime!

MAIL ORDER FORM TODAY!

Popular Science Pub. Co., Dept. 752
353 Fourth Avenue, N. Y. 10, N. Y.

Please send my trial copy of *"How to Build Cabins and Ranch Houses"* today. I'll pay postman $2.49 (plus postage) on delivery. If not delighted, I may return book within 7 days for full refund.

Name .....

Address .....

City..... Zone..... State.....

☐ *Check here if you remit now. We pay postage. Same refund guarantee.*

300-Power Import MICROSCOPE $14.95

LABORATORY MODEL Postpaid

Triple revolving turret has 100, 200 and 300-power lenses! No frills. Just excellent optical qualities, delicate adjustment, solid construction. Its quality and price astounded biology instructors. A lifetime bargain for students, schools, labs, research, amateurs. Anyone can now own one! (Performance cannot be duplicated for $75.00).
FEATURES Fine micro adjustment, adjustable plano substage mirror. Dovetail hardwood case included free. If you are not amazed at its quality, send it back in 10 days. Your money refunded immediately. Send check, cash or M.O. for $14.95 ppd. (Send $5.00 deposit for C.O.D.'s) Free catalog. Money back guarantee.

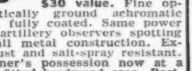
Navy Type Mark XX
20 POWER TELESCOPE $9.95

$30 value. Fine optically ground achromatic lenses, fully coated. Same power as standard artillery observers spotting scope. Precision all metal construction. Extends to 15¼ inches. Rust and salt-spray resistant. A valuable ship and boat owner's possession now at a price everyone can afford! Shipped in fitted hardwood case. Postpaid. **$9.95.**

the AKRON 4400 SUNSET BLVD. LOS ANGELES 27, CALIF. OPTICAL DEPT. **7-S**

SHEET METAL BRAKES

Forms angles, flanges and Pittsburgh locks. 26 gauge steel, heavier aluminum. Cam locking. Portable, can be bolted to bench, or clamped to edge of truck. All steel, reinforced. Shipped Exp. Coll. 30" size, Wt. 54 lbs., **$26.50.** 36". Wt. 66 lbs. **$31.00.** 48". Wt. 100 lbs. **$45.00.** Floor mountings, portable, 32" high, 30 lbs., **$7.00.** 12" **BRAKE.** Fits in vise to form difficult compound bends, up to 20 gauge steel. Not illustrated. .....**$12.50 P.P.**



30"—36"—48"

IRON BENDER. Forms hooks, angles, eyelets, etc. Capacity, ¼x2", 5/16x1½". 10 parts all steel. .....**$10.00 Post P.**

Immediate delivery. Order direct, cash or C.O.D. or send for folder.

VYKE BRAKE CO., S-1116 So. 27th St., Omaha 5, Nebr.

ELECTRIC MOTOR BARGAINS!

½ HP 1750 or 3450 RPM 19.75 — 1 HP 1750 RPM 52.00
1½ HP 3450 RPM 47.50 — 2 HP 3450 RPM 65.00

All prices F.O.B.
Immediate Delivery

Every Motor Fully Guaranteed

Heavy Duty, Repulsion Induction and Capacitor Types. 110-220 Volts, 60-cycle, Single-phase. Standard Makes (G. E., Wagner, Leland, Westinghouse, etc.). Rush your order **TODAY**—large stock of motors—1 & 3 phase. **32-v. direct current bargains also.**

ROBERTS ELECTRIC CO., 849 W. Grand, Dept. 15, Chicago

BRONZE FOUNDRY

Schools and Home Workshops

Make your own castings of aluminum, copper, bronze, silver. Foundry sets are available in three sizes including 2400 Deg. F. blast Furnaces, $22.50; $29.50; and $42.00. f.o.b. Kansas City. Free Circular.

KANSAS CITY SPECIALTIES CO. P. O. BOX 6022, DEPT. S-7 KANSAS CITY, MO.

Jet Power ...for your CAR with the ECON-O-MISER

U. S. Agriculture's Exhaustive Tests (Bulletin AIC-240) show:

Up to 30% mileage increase
More of engine's power utilized
Less Ping or Detonation

By Water Alcohol Injection in high compression engines.

ECON-O-MISER is designed to help your motor attain *maximum power, speed, mileage.* Operates automatically on vacuum. Injects right amount of water and alcohol into fuel system for Efficient Motor Operation. Reduces Carbon, Ping or Detonation. *Try this amazing invention on 30 day free trial.* **Unconditional Money Back Guarantee.**

ONLY $14.95

Send cash, check or money order-Specify Year, Make & Model.

Complete with tank, bronze injector, Carburetor Flange, hose and all fittings for easy installation.

ECON-O-MISER MFG. CO.
3019 Pico Boulevard, Santa Monica 2, California

- and only 50¢

20 *original* projects . . . drawings, photos, step-by-step instructions . . . tips on joinery, gluing, finishing . . . send $.50 cash (no stamps) per copy, $.65 outside U.S.A. Limited first edition, order today.

ATLAS PRESS COMPANY
Atlas 755 North Pitcher Street, Kalamazoo, Michigan
DEPENDABLE QUALITY TOOLS SINCE 1911

$1.00 BRINGS YOU BOTH CANS!

Yes sir—give your car the glow that rests your elbow! Use LACQUER CLEANER, the amazing pre-wax cleaner, and LACQUERWAX, the famous car finish protector. It's 5 times faster and easier to apply than ordinary paste waxes. *One treatment lasts 6 months or longer.*

LACQUERWAX contains no lacquer, but this hard, liquid wax is CLIMATEPROOF! Its brilliant luster shines right thru hot sun and driving rain. You can't wash it off—it won't spot! It brings out and *preserves* the full beauty of your car's finish. Use the LACQUER CLEANER first to remove dead paste wax and dirt, then LACQUERWAX for the beauty treatment. BOTH 10 oz. cans—ample to do your complete car—for ONLY $1. Mail coupon NOW!

LACQUERWAX CO. Dept. PS-7
31 SPRUCE ST., HARTFORD 3, CONN.

Gentlemen: My dollar bill, check or money order is enclosed for the 2 ten oz. cans—LACQUERWAX & CLEANER.

Name .....
Address .....
City..... Zone.... State.....

LACQUERWAX

TAKE LESS THAN 1 MINUTE TO

Keep Paint Brushes Like NEW!

Store Them Dry. They Stay Soft and Flexible READY FOR INSTANT USE!

PROCESS 33

INSTANT PAINT BRUSH CLEANER

- Quickly cleans fresh paint from a paint brush or roller.
- You can paint instantly with another color—or store brush dry—it will stay soft.
- Economical—can be used again and again.
- Safe for all brushes and rollers.

Pint 59¢ Quart 98¢ Gallon $3.25

Wherever Paint is Sold

Your Finest Buy for HOME, FARM, WORKSHOP!

Black & Decker

ELECTRIC UTILITY TOOLS

PORTABLE ELECTRIC TOOLS

DRILLS • SANDER - POLISHERS • SAWS

INTERNATIONAL ROTARY

HI-SPEED IT DRILLS · COPE-SAW IT SAWS · DRILL-BIT IT REAMS

DRILL, SAW, REAM . . . metal, pipe, wood, plastic, Transite, etc. Use with any electric drill, slow drill press, lathe or milling machine. Drills own starting hole—upper part of bit is used to cut, saw or ream circles, ovals, squares or scrolls. Easy to operate. Ideal for carpenters, mechanics, electricians, plumbers, hobbyists, many others. Abrasive resistant, high speed steel. Flutes ground from solid. Will withstand severe continuous use without breaking. Resharpened at no charge. Takes place of up to $50 in tools. ¼" diameter, 2" cutting sections, total length 3½". Also available specially designed for wood or metal and in 2¾" and 1¾" lengths. Write for details. Specify all-purpose bit. Shipped same day. Money-back guarantee. Dealer inquiries invited.

SEND CASH. CHECK OR MONEY ORDER

Manufactured and distributed by:

INTERNATIONAL TWIST DRILL CORP.

618 Wyandotte, Rm. 93 Kansas City 6, Mo.

only $3.95 POST PAID

AMAZING TOOL BARGAINS!

ALL BRAND NEW MERCHANDISE

12 MINIATURE CUTTERS FOR CUTTING WOOD, PLASTIC, or METAL $1.00 Postpaid

Actual size. Asst. shapes on 3/32" shank. For die makers, home workshop, etc.

12 MOUNTED WHEELS and points on 1/8" Mandrel. $2.95 Postpaid

For grinding on plastic, wood soft and hard metals. Regular $8.40 List Val. 12 wheels on 1/4" Mandrel $3.60

18 MOUNTED POINTS ON 3/32" MANDREL $2.50

SCHUPACK SUPPLY CO., 7331 Cottage Grove, Dept. S-33 Chicago 19, Ill.

NEW 1952 Illustrated Catalog 10c

HOBBYISTS! SHOPMEN! Special ONLY $54.50

PALMGREN "HOBB-E" Rotary, Index, Milling Table

Ideal for Model Parts or Shop Work

Mill-Grind-Drill-Index-Rout curved or straight-Rabbet and Mortise on drill press or lathe. 8" Table, 4" Cross Feed, 360° Rotation, Accurately Graduated. Bolts to table. Order NOW! SAVE $100. Only $54.50. Less Rotary Feed $43.75. Write for "HOBB-E" Tool Circular.

CHICAGO TOOL and ENGINEERING CO.

8396 South Chicago Ave. Chicago 17, Ill.

AMAZING BARGAINS---Save to 70%!

- Power Plants
- Hand Winches
- Chain Hoists
- Telephones
- Binoculars
- Barometers
- Air Compressors
- Water Pumps
- Electric Tools
- Contour Levels
- Flood Lights
- Air Grease Guns
- Paint Spray Outfits
- Gasoline Chain Saws
- Weed Spray Outfits
- Magnetic Recorders
- Hydraulic Units
- 100s other items

We pay all freight. Rush card for illustrated bargain sale catalog. Send today.

FREE CATALOG

BURDEN SALES COMPANY

829 "O" ST. LINCOLN, NEBRASKA

Build your own JET ENGINE!

Order these plans today

1. JET PROPELLED BICYCLE. Assemble your own. Photo and instructions $1.00.
2. HOW TO MAKE EXPERIMENTAL JET ENGINES. Seven sheets drawings with information and instructions $2.95.
3. BOTH OF ABOVE in one order $3.75.

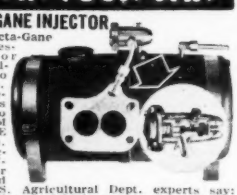
SEND NO MONEY. Order both at once $3.75 C.O.D. in USA plus c.o.d. postage. Send check or Money Order and we pay postage. Get other information too. Rush Order.

J. HOUSTON MAUPIN, Dept. 66, Tipp City, Ohio

When Writing to Advertisers Please Mention Popular Science

BURN WATER IN YOUR CAR

With The OCTA-GANE INJECTOR



The famous Octa-Gane all bronze pressure injector burns up to 1 gallon of water to 10 gallons of gas. It has produced results for thousands of motorists who demand PREMIUM PERFORMANCE from regular gas. KNOCK-FREE acceleration and SUPER-POWER for fast take-offs and hill passing. U. S. Agricultural Dept. experts say: "The gasoline mileage of high compression automobile engines can be increased up to 30% with the use of water-alcohol-gasoline fuels." WRITE TODAY FOR YOUR FREE GOVERNMENT REPORT *and Information on Our "Buy Without Money" Plan.*

WRITE FOR FREE ILLUSTRATED LITERATURE

NARCO, DEPT. HO-7 VENICE, CALIF.

RETAIL PRICE $125.00

FACTORY TO YOU $79.95

SUPERSHOP is a PRECISION-BUILT WORKSHOP. 100% ball bearing. All running parts precision ground. Big capacity. Extra rugged. Amazing value. Write for FREE catalog.

BUY ON EASY PAYMENTS

POWER TOOLS, INC. 237 YATES AVENUE, BELOIT, WISCONSIN

USE KESTER METAL MENDER
(GENUINE TIN LEAD SOLDER)

For all Metal Repairs

FREE: "Soldering Simplified." 16 page illustrated booklet. Get your copy now.

Kester Solder Company
4254 Wrightwood Ave.
Chicago 39, Illinois

MAGNETS LIFT 225 lb.
GENUINE ALNICO—NEVER WEAKENS

AMAZING, PERMANENT MAGNETS—WILL NOT WEAKEN! NON-ELECTRIC Retrieve guns, tackle, tools and other steel items from lake, river, plating tanks, drains or other hard-to-reach spots. Recover drills, taps, etc. from sweepings. Clear alley of harmful tacks, nails. Many other uses. Pays for itself quickly. GUARANTEED. Try any magnet one week. Money refunded if you are not well pleased.

No. S-725 (Weighs 54 oz.) Has pull of 225 lbs. on steel block $15.00
No. S-675 (Weighs 49 oz.) Has pull of 175 lbs. on steel block $10.50
No. S-650 (Weighs 41 oz.) Has pull of 150 lbs. on steel block $ 8.50
No. S- 30 Hobbyist assortment of six small magnets..... $ 1.50

Send Money Order or check. We pay postage. No C.O.D.'s.
MIAMI MAGNET COMPANY, 3240 N.W. 27th Ave., Miami 42, Fla.

DO IT EASIER---FASTER---BETTER with a SHAW "DU-ALL"

Walking or Riding Tractor

1½, 2½, 3 and 5 H.P. walking tractors for all large and small gardening. 5, 8 and 12 H.P. riding models that will handle good sized farms. Quality built for 50 years. All wanted tools and attachments. See the Shaw dealer. Write for **FREE CATALOGS,** low prices on complete Shaw line. Address

SHAW MANUFACTURING CO.
5707 Front St., Galesburg, Kansas
668-PS N. 4th St., Columbus, Ohio

It's a cinch to Install!

Combustioneer®
AUTOMATIC
HUMIDIFIER

A few dollars, your own tools, a couple of hours will give your home all the benefits of healthful, protective *automatically humidified air!* Yes, in your *present* warm-air furnace—coal, gas or oil! No plumbing necessary!

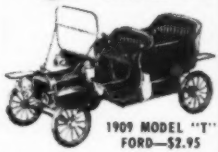
Exclusive **Combustioneer** *features*...Twin-Valves of stainless steel, can't rust, corrode or leak . . . "Noverflow", prevents water dripping *inside* furnace . . . big "Thirsty-Thick" ceramic plates for larger water evaporation area . . . Selector Dial for positive humidity control . . . Water pan of heavy non-corroding metal.

Low Prices! Model CH-300, 4 plates for 13" to 20" plenum (width or length), $20. CH-200, 6 plates for 22" to 25" plenum, $22, F.O.B. Springfield, Ohio. Prices include 10 feet of tubing, saddle valve and adjustable hinge face plate. Immediate shipment. Check or Money Order. **Combustioneer DIV.**

THE STEEL PRODUCTS ENGINEERING CO.
1225 W. COLUMBIA STREET, SPRINGFIELD, OHIO

Easy-to-Build ANTIQUE AUTOS
They're Authentic ¾" Scale Models!
$1.95 to $3.95

1911 MAXWELL—$2.50


1909 MODEL "T" FORD—$2.95

1909 STANLEY STEAMER—$2.95

1904 OLDSMOBILE—$1.95

Collectors' miniatures! Exquisitely detailed and so easy to assemble in your leisure hours! Measure 6" to 10½" in length when completed! Kits include ready-shaped parts, wheels, lights, horns, radiators, etc. Also step-by-step instructions. Nationally known; at toy, hobby and dept. stores. Wonderful for shut-ins! Order a complete set—choice of 16 models!

1914 STUTZ BEARCAT—$3.95

FREE! Write for a Copy of Our 4-Color Folder!

IF YOU ORDER DIRECT—add 25c for postage and handling.

hudson miniatures OLD TIMERS
"Originators of Antique Autos in Miniature"
SCRANTON HOBBY CENTER, Dept. 28 Scranton 10, Pa.

BUILD YOUR OWN POWER TOOLS—TILT/ARBOR SAW

BANDSAW
BELT SANDER
SAVE $50. OR MORE

Exclusive GIL-BILT Build-It-Yourself Features

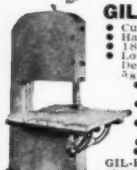
- No machining—build easily with hand tools only
- No blueprint reading—step-by-step pictorial plans, full scale patterns, actual photographs
- Sturdy wood, aluminum and steel construction
- Capacity and performance of commercial saws selling for $60 and up

GIL-BILT 10-INCH TILTING ARBOR SAW

- 27x28 in. table, 13½ in. capacity in front of blade
- 10 in. blade cuts 3¼ in. deep, tilts full 45 degrees
- Floor model 34" high, table always stays level
- New Departure ball bearing arbor, ¾" precision shaft turned down for ⅝" bore blades, alum. housing, shipped ready to run
- Jackscrew and 4½ in. dia. handwheel lowers and raises blade
- Cast aluminum miter gauge and self-aligning rip fence guide

GIL-BILT Metal Parts Kit includes Plans, ball bearing arbor, miter gauge and bar, rip fence guide, dado insert, lock knobs, jack screw mechanism and handwheel, and all other metal parts (less blade) $20.95
Same Kit with 10" Combination Blade $24.90
Same Kit with 8" Combination Blade $23.90

GIL-BILT 12-INCH BAND SAW



- Cuts to center of 24 inch circle
- Handles stock up to 6 inch thick
- 18x18 inch table tilts 45 degrees
- Lower wheel and drive pulley runs on sealed New Departure Ball Bearings; Upper wheel runs on two ⅝" bore Oilite Bronze bearings
- Upper wheel tension and tilt mechanism of cast aluminum, completely assembled
- Upper and lower blade guides. Each has ball thrust bearing, self-lub bronze jaws
- Rigid cast aluminum wheels fully machined ready-to-install. Heavy rubber tires
- Uses standard 78 inch blades up to ⅜ in. wide
- Fully enclosed mechanism for utmost safety

GIL-BILT Metal Parts Kit includes Plans, rubber tires, aluminum wheels, 1¼ in. blade, ball bearing spindle, tilt mechanism, blade guides, table tilt segments, and all other metal parts $21.95

Return Kits in 10 days for refund if not satisfied.
(Prices include postage within 300 miles. Over 300 add 5%)

Also available—Plans and Parts Kit for Belt Sander and 8" Tilt Table Saw. Order Plans at $1.00 each—Send postpaid anywhere in the world or write for FREE descriptive catalog.

GILLIOM POWER TOOLS P.O. Box 1-VG, Lambert Field St. Louis 21, Missouri

NEW 1952 KING MIDGET AUTO

WORLD'S LOWEST PRICED 2 PASSENGER CAR. Drive it for 75c per week. Amazing performance. Surprising comfort. All steel construction. Full accessories, top and heater. Ready to run or assemble it with our bolt together parts. Send 25c for detailed literature or $1 (refunded first order) for actual assembly book and service manual filled with photos, drawings, specifications, etc.

MIDGET MOTORS MFG. CO.
ATHENS, OHIO

new, easy way to.. STRIPE with PAINT

Do Perfect Paint Striping at Home with New Kind of *PAINT STRIPING TOOL*

This Master Painters' **Striping Tool** makes it easy to do expert striping on furniture, bikes, model planes, autos, signs, toys, linoleum, wall board, etc. Makes plain, painted walls look like tile. Paint straight lines . . . curved . . . circular or evenly spaced parallel lines the same way a professional painter does. Simply fill Tubular-Glass Paint Fountain with any color paint and wheel tip feeds paint evenly. Tips interchangeable—jaws split apart for easy cleaning. Tool complete with tips for 1-16 in. stripe only $1.00 postpaid. Other complete tools with 1-64, 1-32, 3-64, 5-64, 3-32, 1-8 inch tips, $1.50 ea. Extra tips — 75c each. **COMPLETE KIT** with tool and 7 tips, $5.00. Here's the handiest tool in your whole painter's kit. C.O.D.'s post. coll.

DEALERS
Paint Striping Tool
packed in attractive display cartons of 1 doz. Fast, profitable seller. Write for illus. circular, discounts.

ONLY $1 POSTPAID

ATTENTION Home Craftsmen and Hobbyists

Just the tool you've been waiting for! New PAINT STRIPING tool gives "professional" results every time, yet simple and easy to use as a fountain pen. Adjustable guide keeps lines straight as an arrow. Just as easy to make curves or free hand designs. Adds new beauty and finished look to everything you paint. Send dollar today.

WENDELL MFG. CO., 4234 N. Lincoln Ave., Dept. 2-M, Chicago 18, Ill.

The Quimbys don't believe in ads

You can't fool the Quimbys with any fancy advertising! They don't even *read* the ads.

Back in the days when all of our modern household conveniences were first advertised, lots of folks rushed out and bought them—later when the ads told of new and better models, they traded the old ones in. Still are!

But not the Quimbys!

The Quimbys just don't know very much about these things of modern America—and they don't own any of them!

And what you don't know can't hurt you—*unless you want* to enjoy life!

We think the Quimbys have been overlooking a mighty good thing.

The manufacturers of the products you buy have been trying to outdo each other for years to bring you new conveniences, new ideas . . . new improvements on the old . . . all of which have given us more of the good things of life than any other country in the world!

Companies can only grow when more people prefer their brand names. No matter how large or how small firms might be—*you* the consumer by your daily brand selections have the *first* and *last* word about their future.

Brand Names Foundation
INCORPORATED
A NON-PROFIT EDUCATIONAL FOUNDATION,
37 WEST 57 STREET, NEW YORK 19, N. Y.

WELLWORTH BARGAINS — ALL NEW EQUIPMENT

the Big 3-Wellworth COMPRESSORS

2 compression and one oil ring, aluminum alloy connecting rod. Stainless steel valves with brass seats and retainers. Cool-flo cylinder head, spray mist lubrication to every moving part. V groove fly wheel. One year guarantee.

MODEL W800 2" bore, 1¾" stroke, 2 to 2.8 c.f.m. up to 150 lbs. pressure. Operates with ¼ or ⅓ HP motor..... **$20.50**

MODEL W200 2½"x2". 2.55 to 4.80 c.f.m. up to 150 lb. pressure. Operates with ½-¾ HP motor. Special Price.. **$27.95**

Shipping wt. 16 lbs. Wt. 24 lbs.

MODEL W7. 2 cylinder 2½"x2". 5.10 to 8.50 c.f.m. up to 150 lb. pressure. Operates with ½-¾-1-1½ HP motor. Wt. 45 lbs. Special Price..... **$54.50**

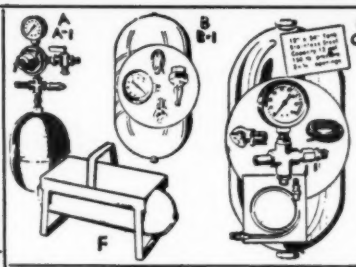
MERCURY CLUTCH

3" A-belt pulley. Centrifugal action for heavy loads. ⅝" bore. $22.50 list. Special Price..... **$9.95**

BARGAINS!
LIGHT PLANTS, GENERATORS, AIR COND. AND FURNACE BLOWERS.
Write for 36 page FREE CATALOG.

PORTABLE AUTOMATIC COMPRESSOR UNIT
⅓ h.p. 2.8 c.f.m. at 100 lbs. pressure. 20 ft. hose and tire chuck. Wt. 90 lbs. $175 list.
Price only..... $98.50
Regulator gauge and filter.....$8.95
Kidde ½" regulator and gauge, $22 Value.....$12.50

Prices F.O.B. Chicago. Money back guarantee. Send check or money order today. Prompt shipment. **Write for Free Catalog.**



GUARANTEED AIR TANKS

Models A, B, and C are rated at 500 lbs. pressure per sq. inch. F, and F-1 150 lbs. ¼ in. standard pipe thread openings on ends as shown.

A 8x5¼, wt. 2 lbs.....**1.50**
A-1 8x5¼, with ¼" regulator, gauge, safety valve, shut-off cock, wt. 5 lbs.....**11.95**
B 24"x6", wt. 7 lbs.....**4.50**
B-1 24"x6", with comb. air gauge, and inflation valve for retaining pressure in tank, tire chuck, 3 ft. high test air hose, wt. 12 lbs.....**7.95**
C 24½x12, wt. 20 lbs. **14.50**
C-1 24½x12, with 20 ft. hose, air gauge, safety valve, copper tubing & fittings, air chuck, 4 way cross, wt. 25 lbs. **19.75**
F 7"x25", with 7⅛"x17" plate and feet, 4 openings, 150 lb. test **14.75**
F-1 Same as F, but 14"x32", with 18"x8" base plate, and feet, 6 openings, wt. 60 lbs. **24.50**

WELLWORTH TRADING CO.
1832 S. Wabash Ave., Dept. B-752, Chicago 16, Ill.

It's NEW, *BIGGER*, Better
The DELTAGRAM...

• 6 GREAT ISSUES *Only* $1.00 •

SEND FOR FREE "*Get Acquainted*" Copy

For only a dollar you get a whole year of Deltagrams—over 100 shop-tested plans, scores of fine projects and many valuable tips on home repairs and care of fine tools. Delta spent months and thousands of dollars to find out what you homecraftsmen want in a magazine—and the new Deltagram is the answer to your demand: 6 wonderful issues each year—truly a treasure house of fun and profit. *Send $1.00 today for your 1 year subscription! Or, if you prefer, first write for a free "sample" copy. Delta Power Tool Division, Rockwell Manufacturing Co., 504G N. Lexington Ave., Pittsburgh 8, Pa.*

NOW—40 different CUTS with AMAZING, NEW Warren DADO SAWING WASHERS *On Your Saw Blade*

Just dial widths to cut parallel grooves perfectly smooth. No warp, vibration or trick screws. Strengthens blade, perfect balance. GUARANTEED! At your dealer's or order direct. Give arbor size—½", ⅝", ¾", 1".

ONLY $4.95 PER SET

Send for free booklet
WARREN WASHERS COMPANY
Dept. 47, Box 98, North End Station, Detroit, Mich.

Save Time!!! Save Money!!!
SEND FOR THIS BIG, NEW
Woodworkers Catalog No. 19

ONLY 15c

New low prices...great selection of fine domestic and imported woods...bargains in hard to get supplies--144 pages of items and ideas for woodworkers. Quick delivery on mahogany, walnut, maple, cherry, poplar, oak, red cedar, and others properly seasoned, kiln dried. Send 15c for your copy--TODAY.

Dept. B7

CRAFTSMAN WOOD SERVICE CO.
2729 S. MARY STREET • CHICAGO 8, ILLINOIS

FREE! Plans Show How To Build A POWER MOWER

Gasoline or Electric Type That Pulls and Steers Itself!

Save time and work cutting grass and weeds—Build a whirl blade power mower, cheaply without special tools or equipment. Send postcard for FREE building plans.

For As Little As **$19.95** Whirl Blade
Electric Less Motor
WRITE TODAY

T & H Mfg. Co., 811 E. 31 St., Dept. 170, Kansas City, Mo.

HOBART "all 'round" WELDING...gets BIG PAYING jobs!

Go anywhere with trailer type gas drive welder

Don't let opportunity pass you by! Set up your own welding shop—get in on one of today's fastest growing, biggest paying businesses. Opportunities are unlimited.

Have your own BIG PAYING business

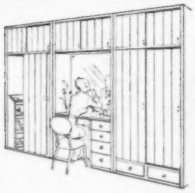
Hobart "simplified" welding makes learning easy, yet gives you an all 'round welder of top performance and dependability. Write for free booklet "Better Welds."

Build a GOOD business reputation with

Write today! **HOBART BROTHERS CO., BOX P-72, TROY, OHIO** **HOBART WELDERS**

Introducing

NOVA PRECISION-BUILT WALL UNITS



Space-savers—money-savers! Precision-built—assembled in 30 minutes! Here are wardrobes, vanity units, dressers, desks, bookshelves, storage walls—each a beautiful piece of furniture in itself; used in combination, there is no sense of sectionalizing.

10" to 26" in depth—they can even take the place of a wall, save as much as 5 feet in total house length. Wide choice of woods—unfinished, or with prime coat, paint, stain or furniture finish. Inner walls and backs are insulating, sound-deadening, mildew-proof. Write for free fully illustrated literature. Dept., 36A—NOVA SALES CO., Trenton 3, N. J.

NEW, IMPROVED CALCULATOR FOR WOODWORKERS only 25c

Instantly gives information on lumber, nails, concrete mixes, painting materials, etc. Convenient, simple to read. Just set dial for nail specifications, to convert linear to board feet, find bit sizes for screws, compare characteristics of woods. 6" diameter heavily varnished cardboard. Send 25c, no stamps, please to Greenlee Tool Co., 2127 Columbia Avenue, Rockford, Illinois.

Drill Your Own Wells!

Sturdily Made—Hundreds of satisfied customers. Purchased and used by U.S. Dept. of Agriculture, U.S. Dept. of Forestry, U.S. Navy and many foreign countries. Fully Guaranteed. LOW FACTORY PRICE, $385.00; less Motor F.O.B. Factory. Price includes drill, bailer and 100' cable, 200 ft. of additional length available at extra cost.

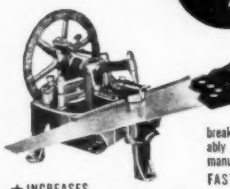
Drill your own wells for that needed water—as many as you need—outside—in the cellar—in the barn. The new improved CONSOL Driller —1951 Model—is equipped with a special replaceable Drill Head. It will drill through many feet of solid rock without resharpening. Simple to operate, easy to set up. Do the work yourself at small cost.

A HEAVY DUTY MODEL for 6" casings also available at $1295, F.O.B. Factory, equipped with Gasoline Engine. Write for free information and booklet, Dept. PS

CONSOLIDATED INDUSTRIES
West Cheshire, Conn.

BeMaCo Dependable

AUTOMATIC SAW SET



Sets 400 teeth per minute on hand or band saws 4 to 16 point. Hammer and anvil action sets teeth accurately and uniformly . . . No tooth breakage. Does a perfect job. Used profitably by saw shops everywhere and saw manufacturers. Every machine guaranteed!

FAST - ACCURATE - DEPENDABLE

★ INCREASES PROFITS

BEAVER MFG. CO.
SAW MACHINE Div. 13-A
800 SOUTH ISIS AVE. • INGLEWOOD, CALIF.

STOP GENERATOR REGULATOR BATTERY TROUBLE

WITH THE *AMAZING* NEW

SELECT-A-CHARGE REGULATOR

AN INVENTION AS GREAT AS THE SELF STARTER!

DIAL CONTROL - AUTOMATIC CHARGE

INCREASE OR DECREASE CHARGING VOLTAGE FOR LOCAL TRAFFIC OR TRIP - SUMMER OR WINTER DRIVING. WITH HIGHER VOLTAGE - INCREASE OR DOUBLE BATTERY CHARGE AND LIFE. *WRITE FOR DETAILS* - FREE!

SCIENTIFIC ELECTRIC CO. P. O. BOX 2162-P, CLEVELAND 8, OHIO

ELECTRIC WELDER

AC or DC 110 Volts

"The Little Marvel" All-Metal welder

5-year written guarantee. Welds 1/8" thick metal or money back. Repairs tanks, tools, fenders, machine parts, etc. Comes complete with everything—rods, unit, eye shield, and directions. We also make a welder for 16 to 22 gauge metal . . . $3.95 complete. Transformer welder $18.95. On C.O.D., postage extra.

$6.45 Complete

ESSAY MFG. CO., Inc., Dept. 47, Quincy 69, Mass.

CASH IN YOUR SPARE TIME!

BIG MONEY IN OWN BUSINESS

YOU CAN MAKE UP TO $40 a DAY sharpening and setting circular saws for factories, builders, lumber yards—with NEW BELSAW COMPLETE CIRCULAR SAW SHOP. **Low Cost, only $15 down,** sharpens 4 to 5 saws an hour. *No experience needed!* Instructions Furnished. Send Postcard Today for FREE BOOK. ▶

LIFE-TIME SECURITY YOUR OWN BUSINESS

BELSAW MACHINERY CO. 4405 Field Bldg. Kansas City 2, Mo.

1952 EDITION

It's New! It's Different! Get world's largest Auto Accessory & Parts Catalog and save money. Over 50,000 items, including Hollywood Accessories, Hi-Speed Equipment, Rebuilt Engines, all parts & accessories for all cars & trucks. We have that Hard-To-Get part! Jam packed with bargains. Completely illustrated. (100 pages) Send 25c (refundable).

J. C. WHITNEY, 1917-F Archer, Chicago 16

POWER MOWERS & KITS

FREE PLANS

LOW FACTORY PRICES DIRECT TO YOU

3 & 4 Wheel Model

4 Wheel Direct Drive

Build your own quality mower with our LOW COST KITS. Parts, Engines. Free Plans guide you. 3 and 4 Wheel Kits, complete. Parts precision finished, ready to use. Write TODAY for Free Plans. Low Prices. Parts List and Guarantee.

America's Finest Power Mowers completely assembled in 3 and 4 wheel models. Belt or direct drive. 18" and 20" sizes. Nationally known make engine. Latest improved features, sturdy construction and money back guarantee fully described in color folder. Write Today.

3-WHEEL KIT NO. T-800

TRIANGLE MANUFACTURING CO., Box S-15, Fort Scott, Kansas

SAVE UP TO 85% ON WAR SURPLUS

"GADGETEER'S HEAVEN"

HYDRAULIC Special

COMPLETE HYDRAULIC POWER UNIT!!

Complete hydraulic pumping unit. All necessary parts assembled & ready to work at a great saving in time and cost to you. Delivers 3½ GPM at 1500 PSI at 1800 RPM. (other volumes and pressures can be attained by simple adaptations) Unit consists of a gear pump driven by a 2½HP, DC motor (4000 rpm max.), relief valve, pressure-unloading switch, filter, accumulator, reservoir with sight gauge & complete plumbing. Mounted on 19" x 25" aluminum panel. Complete with 24V-DC motor (Other motors of any current can be adapted) **49.95**

HYDRAULIC CYLINDER SPECIAL

Gives 20,000 lb. thrust (push-pull) using 1500 PSI line pressure as obtained from our hyd. pumps. Or will produce 40,000 lb. thrust with 3000 lb. line pressure. Can ALSO BE OPERATED ON LOW PRESSURE AIR SYSTEMS. 4" bore, 1¼" dia. piston shaft, 18" stroke, length: 30½". Equipped with ball bearing loaded clevis type mounting and swivel type high pressure steel pipe bracket for easy use. Ideal for road, farm & shop machinery, presses etc. Cost gov't $390.00 . . . . . **29.95**

No. 3 DOUBLE ACTION CYLINDER– Bore is 1" - Shaft is 1/2". Has a stroke of 2½" to 4". Stroke can be adjusted with internal sleeve stops. Overall length is 8¼". Will take 1500 lbs. continuous duty. 3000 lbs. intermittent. Will lift or push up to 1100 lbs. **5.75**

We carry the World's largest supply of Special Hydraulic Equipment featuring over 20,000 cylinders in 41 sizes and types. Can also supply all accessories such as Pumps, Valves, Tanks, Hoses and Fittings. Write for information.

BENDIX HYDRAULIC PUMP AND MOTOR

Has 3½ GPM capacity at 600 PSI. Motor is 1½ HP, 24V, DC. Operates on either 12 or 32V, DC current. Has built-in relief valve adj. to 1500 PSI. This unit ideal for bait tanks, hyd. lifts, portable loaders etc. Cost govt. approximately $350.00. **19.50**

VICKERS HYDRAULIC VARIABLE DISPLACEMENT PUMP GENERATOR

May be used as an elec. motor driven type pressure generator in an hyd. system where a varying volume is desired with a non-pulsating flow. Will give max. volume at pressure settings between 600 & 900 PSI by simple adjustment screw. Pump housing serves as reservoir for system. Has built in compressed air supercharger to make system independent of outside atmospheric pressure. Rotation, left hand only. Max. speed for continuous duty 3750 RPM. Displacement .484 cu. in. per revolution or approx. 4 GPM at 1750 RPM. **32.50**

ELECTRIC GYRO

Turns up to 50,000 RPM. Electric drive motor is integral part of balance wheel. Has double end shaft to drive precision tools or machinery at precise, controlled speeds. Ball bearing mounted. Runs on high or low voltage. Ideal for experimental work, labs, hobbyists, technicians, etc. **4.95**

3 SPEED TRANSMISSION

Converts a high RPM, low power input into low, RPM, high torque output. Has 2 take-off shafts at 4 to 1 & 16 to 1 ratio. Gear box has worn drive bronze gears & throw-out clutch. Will operate forward or reverse directions. Adaptable to many uses on power machinery. **19.95**

90° TRANSMISSION

Has 1½ to 1 gear reduction through bevel gears. Pre-lubricated bearings in dust proof housing. A positive lever controlled clutch... Size 7" x 6". 3/4" take-off shaft. NOW ONLY **3.95**

180° OFFSET GEAR DRIVE

For use where high power at low take-off RPM is desired. Ideal for revolving radio or TV antenna etc. Has 85 to 1 gear ratio. Used **6.75** New **12.95**

HYDRAULIC HAND PUMP

Handle operated. Operating pressure 1000 PSI. Capacity 1.6 cu. inch per cycle. $55.00 Value – **Only 10.75**

AGASTAT TIME DELAY RELAY

Has 24v DC, energizing coil which operates a double pole, single throw relay switch. Holds circuit closed from fraction of second to 15 seconds by means of adj. set screw. Ideal for animated signs, displays, electric locks etc. **2.25**

GADGET MIXES

GADGET MIX – Rivets, Spacers, Bolts, Screws, Gears, Wheel bearings, Springs and Clamps. No. 106, 5 lbs. **1.19**

BEARING MIX. No. 170A. Approx. 20 needle, Ball & Roller Bearings, New & Used. Sizes: 1/2" to 4". Some of these cost Gov't $10 a piece. Never such a value! 5 lbs. ONLY **1.59**

FILE MIX – Ten assorted Files – 4" to 12". Includes Vixens, half rounds, mills, bastards, etc. – in seconds and used but good condition. 1 Vixen alone is worth our price for entire mix. . . **99¢**

IMMERSION HEATER

Designed for installation in water base fluids, as in coffee urns, sterilizers, humidifiers etc. Has two copper-sheathed, tubular heat elements, silver soldered into head. A 3-heat type. 3000 watt. 230v. 2" pipe thread collar. A PALLEY Value **12.00**

WESTINGHOUSE AIR COMPRESSOR

1000's now in use for spraying, inflating, air tools, in garages, laboratories, shops & on trucks, tractors, jeeps, etc. Lightweight but powerful. Operates on ½ HP, gas or electric motor. Runs either direction. Delivers approx 3.27 CFM at 600 RPM or 6.54 CFM at 1200 Rpm. Has 2" bore, 1½" stroke.

We have motors, tanks and fittings to adapt this unit **23.95**

AIRCRAFT CABLE

Rust resistant, alloyed steel. Extra flexible. Pre-formed, 7 x 19 strand. On reels.

1/16" – 4/9¢ ft. (7x7)	7/32" – 10½¢ ft.
5/64" – 5¢ ft. (6x7)	1/4" – 12½¢ ft.
3/32" – 5½¢ ft.	9/32" – 15¢ ft.
1/8" – 7¢ ft.	5/16" – 16½¢ ft.
5/32" – 7½¢ ft.	3/8" – 18¢ ft.
3/16" – 9½¢ ft.	1/2" – 20¢ ft.

SPECIAL 3/16" cable, 18 feet long, with turnbuckle ends . . . **99¢**

Stainless Steel Cable – Pre-Formed
1/16" – 6¢ ft. 5/32" – 20¢ ft.
3/16" – 23¢ ft.

Bronze Cable – Not Pre-Formed
1/4" – 17¢ ft. 5/16" – 23¢ ft.
1/2" – 38¢ ft.

MAKE YOUR OWN ARC WELDER

Use this top quality, precision built R-1 generator. An aircraft generator that originally cost the government approximately $400. Gives 300 to 400 amps at 27 volts. Ideal to convert for all welding, light or heavy up to 5/8" thickness. Free conversion instructions with each unit. **R-1 27.95**

OTHER AIRCRAFT GENERATORS

X-10 12 to 15 Volts 50 Amps $12.95
X-11 . 27 VOLTS . . 200 AMPS $15.95
X-12 . 27 VOLTS. . . 100 AMPS $25.00
X-13 . . . 27 VOLT. 140 AMP.. 16.95
X-14 .. 27 VOLT.. 75 AMP. 15.95

Also available - complete DC Arc Welder. 300 amps continuous. 350-400 amps intermittant. Write today for details.

NEW ILLUSTRATED 230 PAGE – 1952 CATALOG

1000's of **WAR SURPLUS, Factory Close-Outs** and **General Merchandise Values.** For the mechanic, sportsman, hobbyist, home owner etc. BIG SAVINGS on clothing, housewares, hardware, foam rubber, hand & power tools, outdoor equipment, plastics, gadgets & a huge stock of hydraulic supplies.

Send Only 50¢ (tax handling & mailing)

ELECTRIC MOTORS

606 – DELCO MOTOR

1/50 HP, 24v DC, 1.6 amp. turns 3000 RPM. Has adj. overspeed contactor to stabilize and control speed. Length 5½". Diam. 3". ONLY **4.95**

SAMSELL MOTOR

27 volts, 16 amps, 1.5 H.P., reversible, series wound on motor. 3800 RPM, shaft 9.32" diameter, 12 spline. 4-1/8" x 2-3/8". ONLY **3.95**

SURPLUS MOTORS

No. 500 – New 1/2 HP - 27 volt, DC–AC. This motor can be readily adapted to deliver up to 1/2 HP on 110 volts AC by the simple method of rearranging armature brush leads. Free Diagram with each order. A SENSATIONAL VALUE **5.95**

No. 500-A – Converted to 110 Volts, A.C. Equipped with plug and 1½ ft. heavy duty cord . . **8.49**

GEAR HEAD MOTORS

Heavy duty G.E. Gear Head Motor. 1½ H.P., 24 volt D.C., 125 Amp. reversible motor will drive reduction gear box unit 40 to 1, resulting in 168 RPM at 7/8" diameter take-off shaft. Motor contains electro magnetic brake.

UNIT COMPLETE **10.95** MOTOR **4.95**
GEAR BOX ALONE **7.95**

LEAR GEAR HEAD MOTOR – Lear 24 volt DC, 7.5 amp, series wound reversible motor with overload clutch. Motor turns 11,000 RPM driving thru a 10 to 1 gear reduction box which turns the final take-off shaft 1100 RPM. Adjustable limit switches control limit of travel. Take-off shaft adapts to flex or rigid drives. **17.50**

ELECTRIC ACTUATOR

Hundreds of uses for any mechanical device needing controlled 2 way action. Opens, closes, raises or lowers doors... windows...gates...valves.

CTU-2 Foote Linear Actuator. 24V. DC. 8500 RPM, 1/6 HP - series wound motor. 4-1/2" stroke in 13-1/2 seconds. Compression & tension loads up to 350 lbs. Adjustable micro switch for limits of travel. Overall lgth. retracted 11 inches. **7.95**

EA-E1 – EASTMAN ACTUATOR– Has a 1/8 HP, 24 volt DC, 10,200 RPM motor and push-pull actuator. Actuator has 4" travel through a reduction gear box. Has adjustable limit switches & forward & reversing relays. Overall lgth. extd. 20½", retracted 15½". **12.95**

FIRE EXTINGUISHER

Kiddie Lux – CO^2 Type. Built to Gov't specifications. Heavy, shatter proof case. Recent hydro-static test. Reconditioned and fully charged. LIKE NEW! READY FOR INSTANT USE!!

2 lb. size with Swing Nozzle . . 13.75
3½ lb. size with Swing Nozzle . . 17.95
7½ lb. size with Horn 23.75

10 lb. size with New Squeeze Grip Handle & 3½ ft flex hose with Horn. 29.75

15 lb. size with Squeeze Grip hdl, 4ft. flex hose, plastic horn.. $42.50
15 lb. size with Wheel Control . . 37.95

Order From This Ad. Pay by M.O. or check. P.O's. accptd. from D&B firms. Hydepoxit with C.O.D's. All Prices FOB Los Angeles.

PALLEY SUPPLY CO NEW MAIL ADDRESS 2263 E. VERNON AVE. Dept. PS-7 LOS ANGELES 58, CALIF.

What It's Like to Fly a Car

[Continued from page 77]

It's just that the new drive will be a lot lighter.

To make a successful flying automobile, he had to cool his air-cooled engine both aloft and aground. Speed did that aloft. He added a fan for ground operation.

He had to make the fastenings between his car body—or "road unit," as he calls it—and the wings and fuselage absolutely foolproof. He had to devise a propeller-locking device that would permit installation and removal in seconds.

Steering Wheel Moves Ailerons

He had to steer his front wheels aground with the same control wheel used for aileron movement aloft. That was a poser. For safe flying, he had to get full aileron travel with a quick quarter-turn of the wheel. But to retain that fast control in highway steering would have put a driver in the ditch on the first turn.

Fulton solved it by using a Geneva gear—the same device employed in movie cameras and projectors to move the film a frame at a time—to disengage the aileron control from the steering linkage. After the Geneva gear revolves a quarter-turn, sufficient for the ailerons, it releases the aileron control and continues rotating to turn the front wheels. The only noticeable result is a slight thump you can feel as the gear releases.

He had to put four-wheel brakes on the road unit but confine the braking on the plane to the two rear wheels. Braking on four wheels in a landing run would be hazardous.

No Fulton's Folly This Time

Fulton wasn't abashed by the size of the job ahead. He had a mechanical know-how in his bones. His father had been president of a truck-manufacturing company. An uncle started the first transcontinental bus line. Fulton grew up around the experimental department of his father's company and as a kid built his own motor scooters.

When, finally, he had whipped his problems and produced an automobile that would fly, duly approved by the Federal Civil Aeronautics Administration, critics were caustic: "It's not an automobile," they said, "and it's not an airplane. It's only a compromise."

"So's a car," replied the man who built it. "A car can't fly." END

Plastic Cars? Not Now!

[Continued from page 128]

such as custom sports bodies, it is more than offset because expensive steel-stamping presses are not needed. But in mass production the cost of presses is spread over a large number of bodies.

Plastic Production Limited

Also, plastics are limited in quantity. Resin production for 1952 is expected to be slightly above 1,300,000 tons. In contrast, the steel industry turns out almost 85 times that tonnage.

A major stumbling block is that all the production methods developed for plastic cars so far are too slow.

Automotive engineers say that the most practical means of mass producing plastic bodies would be post-forming—the quick and simple pressing of an already cured sheet of plastic laminate into body sections. This is not possible now because the best resins set permanently on curing and lose their formability. And glass fibers used in more durable plastics are not elastic enough for post-forming: if they were, they would lack strength.

Without a post-forming material, the all-important factor of time becomes a tough obstacle. The difference in time between steel pressing and plastic lay-up of auto bodies is hard to figure. A research engineer's very rough guesstimate of the time required for the Glasspar body is 14 man-hours. A steel body, complete and ready for the chassis, takes about 40 man-hours, but there are several hidden gimmicks. The Glasspar is an extremely simple body. And the plastics figure is for forming alone, while the steel-body time includes paint, all trim, and upholstery.

Praise for Plastics

Plastic experts agree with the auto industry that plastic bodies mass-produced in the Detroit manner are not practical now. But they are developing new powerful presses, new resins and new processes. When low-pressure operations can be speeded and perfected, and when plastics meet steel on even ground right down to the last second and the last decimal point and the last fastening, we will be a lot closer to mass-produced plastic auto bodies.

But right now, for this year and next anyway, that super-dingproof fender remains just a super-dingproof dream. END

BUY DIRECT - MASTER MECHANIC - UP TO 85% DISC.

Portable LIGHT PLANT

PUSH BUTTON START

500-700 watts 110-120 v. — 60 cyc. A.C. Powered by a sturdy dependable, easy starting, air cooled 1¾ hp. gas engine. No wiring necessary, just plug in and operate. Plenty of current for any oil burner, freezer, brooder, pump, emergency lights, etc. which require up to 700 watts. Ideal for Civil Defense, Fire Depts: trailers & camps. Complete with Voltmeter and built-in winding to charge 6 v. auto batteries. Wt. 85 lbs. Fully guaranteed. **Be prepared if war or storm knocks out power lines.**

(Item 24) Reg. $275.00 value **$143.50**

700-800 Watt Plant (Item 44) Same as above but greater output. **$169.95**

1000-1200 Watt Plant (Item 45) same as Item 24, but larger generator & engine **$199.50**

GIANT 2000-2500 WATT PLANT

(Item 31) 110-120 V. 60 cyc., A.C. **Absolutely the best made**—exclusive dynamically balanced armature: heavy windings develop up to 3000 watt overload for motor starting. Skid-mounted — portable. Powered by easy starting Briggs or 6 hp. Wisconsin engine —complete with all accessories: engine easily disconnected for other uses. Big outlet box, voltmeter, no wiring necessary. Ample current for all purposes. Factory warranty and instructions included. Wt. 220 lbs. Reg. $585.00. Special at... **$299.50**

With Electric Self Starter (Item 179) **$359.50**

GENERATOR ONLY and control box. Drive it with your engine or tractor **$169.50**

TRANSFORMERS—Item 197) Convert 110 v. A.C. to 220 v. Capacity 2 kva. Simple hook-up. Regularly $55. Our price—when purchased with light plant **$27.50**

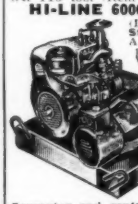
Purchased separately $34.50.

3000-3500 WATT PLANT

(Item 198) 110-220 v.—60 cyc. A.C. with Wis. Engine, **push button start.** Wt. 370 lbs. Heavy duty **$399.50**

Generator only for belt drive, Wt. 115 lbs. (Item 198A) **$239.50**

HI-LINE 6000 WATT PLANT



(Item 162) **Push Button Start,** 115-230 v. 60 cycle A. C. A brute of a power plant with a rugged 13 hp. Wisconsin engine. Plenty of electricity for ranges, water heaters, freezers, pumps, machinery, etc. Affords both 110 and 220 volts. Ideal where heavy current is needed. Wt. 590 lbs. Easily worth $995.00. **With self starter.** Factory Spec. **$645.00**

Generator and control box only, belt driven. Use your engine or tractor. **$345.00**

Wt. 240 lbs.

Buy Wholesale—Direct From Factory—World's Largest Direct Sellers of Light Plants.

You can pay more — but you can't buy better

STANDBY POWER CONTROL

(Item 207) For hospitals, radio stations, fire depts., etc. Automatically starts light plant when power fails. Available for all our plants. From **$59.50 to $99.50.**

MASTER AIR COMPRESSOR

(Item 209) High pressure type for large volume of air for heavy duty service. For paint spraying, inflating truck and auto tires, greasing, and the hundreds of other jobs done by compressed air. Piston type. 2"x2" compressor with built-in air filter, master built with hi-strength alloys and precision bearings. Stainless steel tank, 12" x 24", 2100 cu. in. cap. Safe up to 500 lbs. Equipped with automatic switch that starts and stops motor to maintain desired pressure (up to 150 lbs.) and check valve, safety valve, gauge, shut-off valve, 20 ft. air hose and tire chuck. Beautifully balanced on ball bearing wheels and rubber tires. Note low factory price.

With 1½ hp 110 v. A.C. motor (Reg. $175.00) (Item 209) **$98.50**

With 1½ hp motor (Reg. $199.50) (Item 209A) **$119.50**

With 2 hp Briggs Gas Engine (Reg. $199.50) (Item 209B). **$109.50**

Compressor only (2"x1¾") (top quality) (Item 209C) **$20.50**

Larger Compressor (2"x2") (none better) (Item 209D) **$24.50**

Giant Compressor (twin 2½"x2") (Item 209E) **$54.50**

A complete line of spray guns and air tanks available at factory prices.

IMMEDIATE DELIVERY—ALL ITEMS

HEAVY DUTY D-C ARC WELDER

(Item 38) Use as portable or shop welder. Up to 300 amps. Senior model. Made for years of trouble-free, continuous service. Will handle light or heavy jobs. Easily welds up to ¾" plate using ¼" rods. Built-in air-cooling system. Arc is easy to strike and hold, because of specially designed arc stabilizer. Hi-lo switch and dial control gives wide range of welding heats. Run welder at 2600 rpm. with **tractor, Jeep or 15 hp. gas engine, or 7 hp.** elec. motor. Complete with instructions, guard, and double V belt or flat pulley. You can pay more, but you can't buy a better welder. Wt. 110 lbs. $400 value at.. **$99.75**

DUAL CONTROL MODEL same as above but with built-in dual rheostat for low heat soldering, brazing, welding. Spec. **$119.50**

WELDING KIT. Two 10 ft. leads, welding helmet, electrode holder, ground clamp. Sold only with welder at.... **$10.50**

EXTENSION CORD

(Item 16) 40 ft. heavy **duty,** made of specially insulated No. 14 2-conductor wire. So tough that you can drive over it and yet flexible and easy to handle. Resists oil, grease or water. Extends electricity up to 400 ft. without voltage drop. Use indoor or out. Complete with heavy rubber plug and outlet. Wt. 2½ lbs. Usually $4.50—Special 40 ft. **$1.99**

Comb: 2-40 ft. and 1-20 ft. (total 100 ft.) **$4.95**

100 foot length (one piece) **$4.85**

WIRE ONLY (Item 50) No fittings, 100 ft. **$4.00**

HEAVY DUTY POWER CABLE

#12—2 Cond.—stranded, very flexible, rubber covered, special outside conductor for grounding power tools, etc. Finest heavy duty power cable made. U.S. Surplus.

50 ft. (Wt. 8 lbs.) Item 199 ..... **$6.95**

100 ft. (Wt. 16 lbs.) Item 200 ..... **$12.95**

79 Pc. CARPENTER'S TOOL SET

Professional quality. A complete set of Master Mechanic tools featuring the famous **Stanley** brand. All neatly arranged in a beautiful sturdy 32" lwy. steel tool box. Set includes: Powerful ¼" Electric Drill (optional), 3 Stanley Wood Chisels, 26" Spring Steel Saw, Steel Bench Vise, Tin Shears, 9 Drill Bits, Sharpening Stone, 8" Plane, 24" Stanley Level, Hacksaw, Stanley Rule, 5 Double End Wrenches, 13 Asst'd. Hacksaw Blades, Stanley Hand Drill, 10" Vise Wrench, Comb. Square, Stanley Hammer, Stanley Ratchet Brace, Coping Saw, 7 Coping Saw Blades, Steel Wrecking Bar, 4 Screw Drivers, Offset Screw Driver, Nail Set, 4 Asst'd. Files, 8 Pc. Allen Wrench Set, Auger Bit Set and many other tools. Worth at least $150.00 if purchased separately. Save cost of tools on one or two jobs. A terrific value. Wt. 41 lbs. Item 242 ..... **$39.50**

(without Electric Drill)

Wt. 45 lbs. Item 242A **$49.50**

(incl. Electric Drill)

Wt. 15 lbs. Item 243 ..... **$8.95**

(Tool Box only)

CARRY-IT COMPRESSOR

A hi-pressure (up to 125 lbs.) 2x1¾" Air Compressor powered by a ⅓ h.p. capacitor motor. Built-in 500 cu. in. steel tank tested to 400 lbs. Perfect portable air supply for paint spraying, insecticides, tire inflation, etc. Complete with safety valve, gauge, shut-off valve and all fittings. Definitely superior to outfits selling for $100.00 or more.

Item 226. Wt. 55 lbs. Factory Special **$59.50**

Item 226A. Wt. 30 lbs. Same unit without Motor **$45.00**

Item 241. Accessory Kit—20" Air Hose, Tire Chuck and hi-quality paint spray gun **$10.00**

Factory Prices on Catalog Items

Send 10¢ for **BIG NEW** catalog. We have hundreds of bargains

MASTER GARDENER $119.50

It's a lawn mower — **It's a plow**
It's a power sickle — **It's a Snow Blow**
It's a cultivator — **It's a rotary tiller**

It's a bulldozer

Here at last is a power unit that **does everything** at a price that can't be matched. Built-in power takeoff to drive pumps, saws, generators, etc. Safety clutch—can't burn out. More versatile and efficient than tractors costing twice as much. Basic self propelled 2 hp tractor with Briggs or Clinton famous engine. Only.. **$119.50**

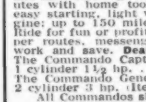
Quickly converts your hand mower to power

Item 206

Rotary tiller .. **$42.50**
Plow **$15.00**
Sickle Bar-Mower ... **$42.50**
Cultivator ..... **$ 8.75**
Bulldozer **$11.25**
Weeder (2-shovel) **$15.00**
Lawn mower hitch (Utilizes any hand mower) ..... **$ 4.50**
Snow Blow **$29.50**

Freight prepaid to most areas. Easy payment plan available.

COMMANDO BIKE MOTOR



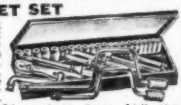
(Item 90) New, super-modern 1952 models. This job is the Cadillac of all bike motors. Sensational Auto-Clutch prevents killing motor at each stop. Also selects proper ratio on hills. Mounts behind and drives rear wheel with Dynarotor. Free Wheeling lever permits pedaling if desired. Rear Mounting eliminates fumes, heat, dirt, and hard steering. Easily installed in 15 minutes with home tools. Sturdy, trouble-free, easy starting, light weight. Airplane type engine: up to 150 miles per gallon. Fully guar. Ride for fun or profit. Ideal for deliveries, paper routes, messenger service, etc. Ride to work and save. **Dealer inquiries invited.**

The Commando Captain, 1 cylinder 1½ hp. **$99.75**

The Commando General, 2 cylinder 3 hp. (Item 91) **$125.00**

All Commandos shipped prepaid in U.S.

32 pc. SOCKET SET



32-pc. Socket Set (Item 59) Highest quality guar. nonbreakable sockets made by Husky. Beautiful matched chrome alloy, absolutely the best. Complete range of 21 sockets from ¼" thru 7/16" in ¼" drive and 7/16" thru 1-1/16" in ½" drive: 2 extensions, reversible ½" ratchet, adaptor bit, slide head, all angle coupling, 2 end wrenches, ¼" speeder handle and sturdy metal tool box. For prof. mechanics who want the best. Wt. 11 lbs. Easily worth $41.50. While they last. **$16.95**

45 pc. SOCKET SET

(Item 205) Contains a complete set of sockets in ¼" drive, ⅜" drive and ½" drive, plus all necessary extensions, handles, speeders, reversible ratchets, etc.; all uncond. guaranteed against breakage. Beautiful matched chromed thin wall alloy sockets in a sturdy handsome steel tool box. Wt. 17 lbs. **$26.95**

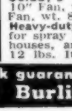
List Price $62.90. Factory Special.

⅜" DRIVE 15 Pc. SOCKET SET

(Item 201) Same top qual. as above—includes 7 sockets ⅜" thru ¾", reversible ratchet, extension, flex. handle, cross bar, 3 punches, metal tool box. Wt. 5 lbs. **$9.95**

List Price $18.96. Our Spec.

HYDRAULIC JACKS



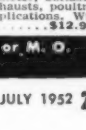
(Item 208) Heavy duty, precision built, smooth, positive acting with built-in relief valve. Hi-Lift with screw extensions. Govt. surplus at a fraction of orig. cost. (Handle included.)

1½ ton (Item 208) Wt. 11 lbs. **$6.45**

3 ton (Item 208A) Wt. 15 lbs. **$9.45**

5 ton (Item 208B) Wt. 17 lbs. **$11.45**

HEATING & VENTILATING FAN



(Item 10) Easily installed in furnace pipes. Forces even heat to all rooms. Over range, removes kitchen smoke and odors. Powerful continuous duty motor, 110-120 v. A.C. Quiet, super efficient fan moves huge volume of air. 400 to 600 c.f.m. 8" Fan, wt. 6 lbs. **$6.35**; 9" Fan, wt. 6 lbs. **$7.45**; 10" Fan, wt. 7 lb. **$8.45**; 12" Fan, wt. 8 lbs. **$9.45.**

Heavy-duty 12" fan, enclosed motor, suitable for spray booths, restaurant exhausts, poultry houses, and other difficult applications. Wt. 12 lbs. Item 10D **$12.95**

All items brand new. Prices f.o.b. Chicago area. 10 day Money back guarantee. Send check or M. O.

MASTER MECHANIC MFG. CO., DEPT. 76A Burlington, Wis.

SAVE 70%

SACRIFICE SALE!

MUST RAISE CASH!
CREDITORS DEMAND PAYMENT!

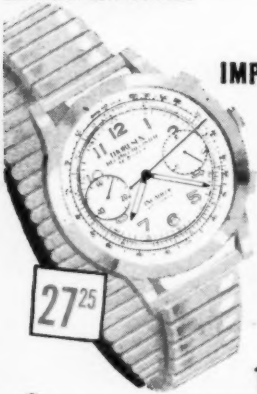
Frankly, we're in a tight fix! Thousands of 17 jewel precision-built watches came in too **late** for last Christmas and far too **early** for the next! Our creditors won't wait! They demand payment **NOW.** Our misfortune is your lucky break! Buy now! Save up to **$70.00** on one watch!

10 DAY FREE TRIAL

Examine . . . check . . . appraise any **THORESEN** watch for 10 days at no risk whatsoever! Full price back if not delighted. **SEND NO MONEY**—Pay price plus postage on arrival. Or send check, cash or money order for quick, prepaid delivery and **SAVE MORE!** Given: **COBRA** Expansion band with every watch, also instructions, Guarantee Certificate and gift shown. Rush coupon now! Prices subject to rise after present over-stock is exhausted. References: **Jewelers Board of Trade, Better Business Bureau or any national bank. Buy with confidence!** Thoresen's is a reliable, nationally known firm. Address:

THORESEN DIRECT SALES, Dept. 7-G
131 WEST 33rd STREET NEW YORK 1, N. Y.

FREE German made **KLAROVIS 3×40 mm SUPER POWER** glasses yours **FREE** with purchase of any watch. Compare to any domestic binoculars claiming 18 mile ranges and selling to **$9.95.** Yours to **KEEP** even if you **RETURN WATCH** for refund.



IMPERIAL DELUXE MODEL 18 kt. Rolled GOLD PLATE
CHRONOGRAPH

TIMES: SPORTS • PHOTOGRAPHY • LAB WORK • SHOP WORK, ETC.

27.25 plus tax

This is the **IMPERIAL** model of the **Recipro-Register Chronograph**—the **BEST** brand available anywhere in the world today! Thousands of proud owners paid much, much more because this is the **Prince** of modern watches—the last word in magnificent styling. Case made of **18 Karat rolled GOLD PLATE** with lifetime **Stainless Steel** back! Precision engineered in the highest traditions of Swiss craftsmanship! A smart, slim unusual timepiece of functional beauty. It's the **"CHRONOGRAPH THAT REMEMBERS!"** Freezes result while movement continues to keep time!

CHECK FEATURES WITH $100.00 WATCHES!

- **5 MULTIFUNCTION DIALS**
- **LUMINOUS NO.'S & HANDS**
- **HAIRLINE SWEEP SECOND**
- **UNBREAKABLE CRYSTAL**
- **17 JEWELS**
- **18 KT. RGP**
- **5 HANDS**
- **INCABLOC**
- **SPLIT SECOND CALIBRATION**
- **2 CLUTCH OPERATION**
- **ANTI-MAGNETIC**
- **SHOCK PROTECTED**

DON'T PAY $100.00 or more to a credit jeweler around Christmas time! Get the Genuine, Original **RECIPRO-REGISTER** at our **SACRIFICE PRICE** for **CASH**—27.25 plus 10% tax, total: **$29.98** (while stocks last). **YOU SAVE OVER $70.00.** Given: Nationally advertised $4.95 **COBRA** expansion band, gift case, instructions and our written guarantee as well as German made **KLARO-VIS** field glasses! Don't lose this bargain of a lifetime—send **TRIAL COUPON—NOW!** Check Number **233-18 K.**

17 Jewel Incabloc
WATERMASTER 12.95

Ever a favorite with sportsmen, Marines, Sailors, Soldiers, Aviators. **Drop it, wet it, jolt it at work or play! Actually runs under water!** Splendid timepiece made with exacting standards. Thousands sold for much higher prices! Compare with waterproofs at **$59.50.** SPECIAL **QUALITY** FEATURES: Incabloc Protected • Shock Absorbing • Water Gasket • 17 Jewels • Luminous hands and No.'s • Unbreakable crystal. A guaranteed **QUALITY** timepiece. Best of all you save **$46.55.** Sacrifice price: **$12.95** plus 10% tax, total only: **$14.25.** Order by **No. 224.**

17 Jewel—Full Swing
AUTOMATIC 24.95

The **JET-O-MATIC** makes ordinary watches old fashioned by comparison! It's the **360° FULL-SWING AUTOMATIC!** Just set it . . . then forget it! It winds itself as you wear it. It can never be overwound. Its 17 Jewel **INCABLOC-PROTECTED** movement is a great achievement **SCHILD**—three time **Gold Medal** winner. Besides it's Water & Shock resistant. You can **DROP** it . . . **JOLT** it . . . even **SWIM** with it! **OUTSTANDING QUALITY FEATURES: Raised Gilt Numerals • Radium Applique Markings • Unbreakable Crystal • Tested 17 Jewel Precision Movement • Hairline Sweepsecond • Stainless Steel Screw-back • Split-second calibrations** • Thin, small, smart! NOW—**NOT** $92.50. Special summer price—**$24.95,** plus 10% tax, total: **27.45.** Order by Number **238.**

UNCONDITIONAL GUARANTEE EXCLUSIVE OF PARTS!

FREE repair service **ANYTIME** if needed by skilled watchmakers—for the **LIFETIME** of this firm. No cost ever for "handling," adjustment or service. **FREE** annual oiling and timing service. **THORESEN** makes **LIFETIME FRIENDS! Remember:** If you are not satisfied with your purchase after 10 day trial, return for full price refund. Our written **Guarantee Certificate** enclosed with every watch!

SEND NO MONEY! Mail Coupon now for home trial!

THORESEN DIRECT SALES, Dept. 7-G
131 West 33rd Street, New York 1, N. Y.

RUSH watch(es) checked on **10 DAY TRIAL.** Send following **FREE** of extra cost with each and every watch purchased: 1. Reg. 4.95 COBRA Band. 2. **KLAROVIS** German Glass. 3. Guarantee Certificate. 4. Gift Box. 5. Instructions.

☐ Payment enclosed. Send prepaid. ☐ Send C.O.D., **plus post.**

CHECK WATCH DESIRED. (Prices shown here are tax **paid.**)

☐ No. 233-18K CHRONOGRAPH—$29.98 ☐ No. 224 **INCABLOC—$14.25**

☐ No. 238 AUTOMATIC—$27.45

You are to refund **FULL PURCHASE PRICE** if I am not delighted, **keeping the "Klarovis"** as your gift to me.

NAME_____

ADDRESS_____

TOWN_____ STATE_____

Let I.C.S. put you on the r

I.C.S. OFFERS 391 WAYS TO GET AHEAD

RADIO-TV

Wide-open, fast-moving field. Look for big gains in TV—new stations, UHF channels, improved color. Excellent opportunities for qualified servicemen, electronics experts, operating technicians. Up-to-date training essential.

AVIATION

Defense orders expected to double airframe and engine production. There's already an urgent need for aircraft draftsmen and aeronautics engineers, tool designers, mold-loftsmen, machine shop workers, mechanics. Good openings for trained newcomers.

AUTOMOTIVE

Cutbacks in new-car production will keep old cars on the road. Means big business for auto mechanics, body rebuilders and refinishers. Increasing demands for new men. Experience not so important as proper training.

ENGINEERING

New engineers can expect many attractive offers, can take their pick of jobs. Starting salaries of $100 a week. Industry desperately needs chemical, electrical and mechanical engineers. Will readily accept men trained by reputable schools.

YOU'RE too smart to stay in the same old rut! You know that you have one life—that's all. So you've thought about *doing* something that would advance you in your work, increase your income.

The time to get started is *now*. And you can take the first step toward Personal Success this very minute!

Just look over the prestamped, preaddressed card below and mark the I. C. S. course in your field of interest. Then mail it—*today!*

We'll send you complete information on the International Correspondence Schools, and how they can give you the training you need to get ahead faster. Cost is low, texts are easy to understand, and every student gets *personal* service.

The time to "take steps" is RIGHT NOW!

DRAFTING

Opportunities are exceptionally good. Will get even better during the year. Qualified men due for rapid advancement. Quick training available for beginners. Aircraft, ship, electrical drafting head list of essential classifications.

BUSINESS

Outlook is especially bright for accountants, federal tax experts, traffic managers, typists, stenographers. Employers will put greater emphasis on specialized training in effort to trim costs and step up efficiency. Self-improvement will be welcomed and rewarded.

ACT NOW! Mark and mail this prepaid postcard for complete information on how I. C. S. can help you to success!

FREE HIGH SCHOOL BONUS

By taking a regular I. C. S. course, you can earn *bonus credits* toward a high school diploma.

You choose whatever course you want (there are 391 courses to choose from). Then, as you study, you automatically earn up to one-half the credits required for an I. C. S. high school diploma. No extra work. No extra cost.

It's a free bonus you get with *every* I. C. S. course!

oad to success

thing can hold you back . . .
if you start TODAY!

Step by step you can reach the job and pay you want.

• Please send me complete particulars about the course BEFORE which I have marked X:

Air Conditioning and Plumbing
- ☐ Air Conditioning
- ☐ Heating ☐ Plumbing
- ☐ Refrigeration ☐ Steam Fitting
- ☐ Chemistry, Analytical
- ☐ Chemistry, Engineering
- ☐ Chemistry, Industrial
- ☐ Petroleum Refining Operator's
- ☐ Plastics ☐ Pulp and Paper Making

Civil Engineering, Architectural and Mining
- ☐ Architecture
- ☐ Architectural Drafting
- ☐ Bridge and Building Foreman
- ☐ Building Estimating
- ☐ Civil Engineering ☐ Coal Mining
- ☐ Concrete Engineering
- ☐ Contractor's, Building
- ☐ Highway Engineering
- ☐ Structural Drafting ☐ House Planning
- ☐ Structural Engineering
- ☐ Surveying and Mapping

Communications
- ☐ Electronics
- ☐ Radio, General—Operating
- ☐ Radio Servicing, Practical
- ☐ Practical Telephony
- ☐ Television

Electrical
- ☐ Electrical Engineering
- ☐ Electric Light and Power
- ☐ Industrial Electrical Engineering
- ☐ Lighting Technician
- ☐ Power House

Internal Combustion Engines
- ☐ Automobile Technician
- ☐ Aviation ☐ Diesel-Electric
- ☐ Diesel Engines ☐ Flight Engineer
- ☐ Gas Engines

Mechanical
- ☐ Aircraft Drafting ☐ Foundry Work
- ☐ Heat Treatment of Metals
- ☐ Industrial Engineering
- ☐ Locomotive Machinist
- ☐ Mechanical Drafting
- ☐ Mechanical Engineering
- ☐ Machine Shop
- ☐ Patternmaking, Wood-Metal
- ☐ Reading Shop Blueprints
- ☐ Sheet-Metal Worker
- ☐ Ship Drafting ☐ Shipfitting
- ☐ Tool Designing ☐ Tool Making
- ☐ Welding Engineering

Railroad
- ☐ Air Brake ☐ Car Inspector
- ☐ Diesel Locomotive
- ☐ Locomotive Engineer
- ☐ Railroad Car Repairer
- ☐ Section Foreman

Steam Engineering
- ☐ Boilermaking
- ☐ Combustion Engineering
- ☐ Engine Running
- ☐ Marine Steam Engineering
- ☐ Steam Electric ☐ Steam Engineering

Textile
- ☐ Cotton Manufacturing
- ☐ Loom Fixing ☐ Rayon Weaving
- ☐ Textile Designing
- ☐ Woolen Manufacturing

Business and Academic
- ☐ Accounting ☐ Advertising
- ☐ Bookkeeping
- ☐ Business Correspondence
- ☐ Business Management
- ☐ Certified Public Accountant
- ☐ Commercial ☐ Cost Accountant
- ☐ Federal Tax ☐ First Year College
- ☐ Foremanship
- ☐ Good English ☐ High School
- ☐ Illustrating ☐ Postal Civil Service
- ☐ Retailing ☐ Retail Store Management
- ☐ Salesmanship ☐ Secretarial
- ☐ Traffic Management

Name _____ Age _____

Street and No. _____

City _____ State _____

Occupation _____ Working Hours _____ A.M. to _____ P.M.

Employer _____

Representatives in cities and towns throughout the world
Special Tuition Rates to Members of the Armed Forces

Your ticket to success

DON'T THROW THIS CHANCE AWAY!

If you feel the urge to better yourself, if you have the WILL to get ahead, obey these impulses now! Let I.C.S. give you complete information on a program of action to push you ahead, to equip you for a better job, bigger responsibility, more pay—the respect and admiration due the men who are preparing *NOW* to be tomorrow's leaders. Don't neglect this chance . . . don't risk blaming yourself later . . . take this first step . . . set the wheels in motion . . . send the card right now!

• • •

What can you lose?
There's everything to gain!

SEND THIS CARD TODAY!

Postage Will Be Paid by Addressee

No Postage Stamp Necessary If Mailed in the United States

BUSINESS REPLY CARD
FIRST CLASS PERMIT No. 1000, Sec. 34.9 P. L. & R. :: SCRANTON, PA.

INTERNATIONAL CORRESPONDENCE SCHOOLS
1000 WYOMING AVENUE
SCRANTON 9, PA.

Box 7606-N

"Net Profit-$75.56 ON VERY FIRST DAY!"

R. E. MEADE

"You should have named your extinguisher 'Miracle' instead of 'Presto.' I have never seen fire extinguished so quickly and thoroughly. My sample order of two dozen brass *Prestos* arrived late Thursday afternoon. Friday morning, in 15 minutes, I had orders for 18 extinguishers. Mind you this all happened in 15 minutes and without the first demonstration. By Friday evening the balance of 2 doz. were sold and orders taken for a dozen more. I had made a net profit of $75.56 the first day! Who said it couldn't be done? If you find such a man send him to me."

—R. E. Meade, Columbus, Ohio

"For every hour I have devoted to the 'Presto,' I find that I have earned an average of $15.20 an hour. I am devoting more of my time to this product now since I have discovered that the earnings on this item are greater than any item I have handled in the past."

—William F. Wydallis, Van Wert, Ohio

CHARLES KAMA

This Presto salesman from Texas was featured as "Salesman of the Month" on the front cover of a sales magazine. He told the magazine's reporter:

"I think I've succeeded pretty well. I'm making more than a thousand dollars a month—and I haven't touched bottom yet."

Folks Are Amazed when you Tell Them This New Kind of Protection Costs Only $3.98

Reported Presto Salesman R. E. MEADE. "The sky's the limit" on Presto profits because of America's serious need for this new fire extinguishing discovery.

WOULDN'T YOU like to be making the kind of money R. E. Meade made? Of course, not everybody makes such profits on the very first day. But, how do you like profits like these: A Florida salesman earned $600 in one month. An Ohio man earned $2100 in 2 months. A New York salesman earned $1500 in one month. A New Hampshire salesman added the Presto as a *sideline* and picked up an extra $1800 in 20 months.

What is the Secret?

PRESTO contains an amazing new chemical "Chlorobromomethane" or "C.B." developed as a secret defense against fire during the war. In comparing the effectiveness of "C.B." in fighting various kinds of fires an authoritative testing laboratory states: "It has been proved that *'C.B.' is about 1.5 to 6 times as effective as other common extinguishing agents on an equal weight basis.*"

This extra effectiveness of "C.B." means that Presto can be made light and handy enough for even a woman or child to use. Just a twist of the knob . . . and flames disappear! "Sells on sight" to civil defense workers, owners of homes, cars, stores, farms, service stations, boats, motorcycles, factories, offices and to stores for re-sale.

Why Large Presto Profits Are So Easy

Everyone is terrified at the very *thought* of *FIRE! Every year* fire kills more than 11,000 people. Most people who see Presto in action want one or more — ESPECIALLY WHEN THE PRICE IS ONLY $3.98 EACH!

You can demonstrate Presto in a few minutes, and every sale will net you $1 or more. We refill your demonstrator free . . . and we give you dramatically powerful printed sales material to "talk from" . . . free certificates testifying that Presto is GUARANTEED FOR 20 YEARS.

Over One Million Presto's Already Sold!

YOU DON'T NEED TO INVEST A PENNY. Just collect and *keep* $1 or more every time you write an order—we collect the balance and deliver the extinguisher. (Or if you *wish*, you can buy from us at extra-low wholesale prices and then make up to $2.18 profit per unit supplying both dealers and retail customers—we'll send you free details.)

START NOW—MAIL COUPON

Get started in this rich new field now. Don't "put it off"! Every day you hesitate may cost you $10, $15, or even $50 you could otherwise be making. Mail the coupon at left NOW for everything you need to get started right away!

MERLITE INDUSTRIES, Inc., Dept. 117, 201 East 16th Street, New York 3, N. Y.

MERLITE INDUSTRIES, Inc., Dept. 117
201 East 16th Street, New York 3, N. Y.

Please send me illustrated sales literature, liberal profit plan, order blanks—everything I need to get started making good money introducing the Presto Fire Extinguisher in my locality.

☐ **CHECK HERE IF YOU WISH TO ORDER A REGULAR PRESTO TO BE USED AS A DEMONSTRATOR ($2.50).** Pays for itself many times over in increased sales. Can be returned as often as you like for FREE re-fill. You need'n, enclose any money now—we'll send Demonstrator C.O.D. (Or if you wish to save money, enclose $2.50 and we'll pay postage.)

Name.....

Address.....

City..... *Zone No.* (if any)..... *State*.....

IN CANADA: Mopa Co., Ltd., 371 Dowd Street, Montreal 1, P. Q.

Only Presto Has All These Features!

- Ends Fire as Fast as 2 Seconds
- Chemical Contents 1.5 to 6 Times More Effective than Others on an Equal Weight Basis
- Weighs Less Than 1 Lb.
- Easily Held in One Hand—Even by a Child
- Needs No Inspection or Re-Charging—Does Not Corrode or Deteriorate
- Costs Only $3.98—Yet Out-Performs Bulky Extinguishers Costing Several Times as Much
- Automatic Pressure—No Pumping
- Guaranteed for 20 Years—Certificate is Packed with Every Presto

Best Selling Months Are Here! Don't Delay—Mail Coupon Now!

6

"

profits
overy.

g the
e? Of
on the
profits
600 in
0 in 2
500 in
sales-
ne and
onths.

hemical
veloped
he war.
B." in
ritative
proved
tive as
equal

s that
gh for
of the
sight"
s, cars,
rcycles,

asy
ght of
11,000
action
N THE

es, and
ll your
atically
" . . .
ARAN-

ry time
h, you
upply-

ay cost
OW for

s!

on or
Not
orate

—Yet
y Ex-
Sev-
ch

—No

ars
acked